The Builder.

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What the Architect Does for the Country.

TO endeavour to assign a definite value to the services rendered to the country by the architect may well be thought, at first sight, a fanciful, if not an impossible, speculation. Nevertheless there do exist statistics which throw strong light on the subject. We must, in the first place, exclude, as not capable of numeric valuation, any reference to the ennobling functions of art, to the moral and educational effect produced on a people by the silent teaching of the monuments of the past, or of the splendour, elegance, or comfort of contemporary architecture. No calculus has yet been invented by which the value of these functions can be determined. But it is otherwise when we regard architecture from a lower, though still a very truthful, standpoint. From this materialistic point of view the function of the architect is to provide for the housing and shelter of the people; to provide for it, that is to say, as far as regards design, arrangement, and superintendence of execution. As to this, the third volume of the Census of England and Wales for 1881 furnishes a certain amount of information, to the analysis and arrangement of which a short time may be devoted with some utility, we hope, to the public service of the country.

Out of the 26 millions of inhabitants of England and Wales in 1881 (accurately speaking 25,974,439 on the day of enumeration), 43·10 per cent., or 11,187,564 persons, are returned as workers, either by head, hands, or both. They are arranged under five classes, and a proportionate number of orders and sub-orders. The balance, called the "indefinite and non-productive class," consists to the amount of 67 per cent. of females. A portion, 10¾ per cent., consists of males under five years of age; and, if we were to extend this latter category up to the age of fifteen, the 10¾ would be raised to 35 per cent., accounting, in this division alone, for a large proportion of the non-workers. Thus, roundly speaking, the whole male population of the country above fifteen years of age may be regarded as occupied either in professional, commercial, manufacturing, or agricultural industry; the male non-workers among the total number of the population being replaced in the category of toil by workers of the female sex.

Of these 11⅛ millions, nearly, of working bees, the persons directly occupied in providing for the housing of the people form the respectable proportion of 7·3 per cent. But to the 786,660 persons who are enumerated in the census as "working and dealing in houses, furniture, and decorations," a further and very large contingent must be added from industries distributed under different heads. Thus the 28,870 quarriers in stone must be chiefly engaged in preparing materials for the mason and for the builder; and out of the 559,769 general labourers a large proportion must get their living out of building operations. If we consider the number of those unspecified workmen to equal that of the regular tradesmen, even without attempting to assign the proportion of the 663,263 persons engaged in conveyance who are occupied with the carriage of building materials, we shall have a total of nearly 1,600,000 souls, or rather more than one-seventh of the industrial population of the country engaged in the building trade. In this number, moreover, are not included those workers in mines and in metals whose labour is a necessary preliminary to that of the locksmiths, fitters, and furniture makers, who are returned under those special heads.

This great army of workmen is under the control of 6,898 architects, independently of any aid that the latter (who are classified as "artists") may receive from 5,394 land, house, and ship surveyors, or from 7,124 civil engineers. This allows an architect to superintend about 230 workmen, independently, as before said, of carriers and of workers in the primary stages of products that are subsequently perfected as house fittings. If we link the surveyors with the architects, we obtain upwards of 13,000 persons engaged in architectural design and superintendence, being equal in numbers to about one-fourth of the clerical profession, one-third of the legal profession, and one-fifth of the medical profession.

According to statistical returns, the increase in the value of house property, between 1840 and 1880, was 1,371,000,000*l.*, or at the rate of 34,275,000*l.* per year. This does not allow of the expenditure of much more than 2,600*l.* under the direction of each architect and surveyor per year for new buildings; 5 per cent. on which does not produce a very lucrative income. But draughtsmen and pupils are, no doubt, included in the census returns, which goes some way to redress the balance. And if we regard the architect not merely as engaged in providing for new buildings, but as exerting a certain care and control over the general problem of the housing of the people, we find that each of the professional men above indicated has, on an average, to attend to the housing of two thousand persons. On the same broad average, a medical man is required for every 4,000 persons; a clergyman for every 5,000; and a lawyer for every 6,000. We must bear in mind the double function of the architect, as affecting at the same time production and maintenance, to account for the higher rate of demand that is thus made on his service, per 1,000 of the population, than in the case of the other professions cited. The civil engineers are somewhat more numerous than the architects, the respective numbers being 7,124 of the former to 6,898 of the latter. But the annual increase of one part of the work of the civil engineer alone, viz., railways, has been at the rate of nearly 18,000,000*l.* per annum, or half the increase of the value of buildings; while the vast interests connected with mines, ironworks, collieries, stationary engines, and machinery of all sorts, afford employment for the profession of the engineer, of which the civil is not distinguished in the census from the mechanical branch. Of mining engineers the number is 2,291.

Chief in numeric importance of the brigades of the great army of industry, with reference to the housing of the people, are the carpenters and joiners, who amount to no fewer than 235,017, or nearly one in fifty of the whole of the industrial population of the country. Bricklayers are only about half as numerous, counting 125,055; and masons follow hard after, being 97,432 in number. The craft which comes next in importance, being, indeed, more numerous than the masons, are the

painters and glaziers, of whom there are 99,676. Plasterers and plumbers together make up 65,960; the total of these trades, together with builders, slaters, tilers, and paperhangers being 666,738. Furniture and fittings occupy 101,066 persons; and house-decorators, 18,856,—making in all 786,660 persons returned as "working and dealing in houses, furniture, and decorations." The persons engaged in agriculture—who are 1,278,624; the miners and mineral workers, 1,277,592; the workers in textile fabrics, 1,053,648; and the persons engaged in conveyance, 663,263—approach in numeric importance the building trades. The persons working and dealing in machines and implements, who are 267,976, are fewer in proportion than might have been anticipated. The persons working and dealing in food and lodging approach pretty closely to those occupied with houses and furniture, being 629,371. The persons working and dealing in dress (who are distinguished from the workers and dealers in textile fabrics) are 981,105. Thus, as far as can be gathered from the numbers of persons employed, dress costs considerably more than housing, while food requires for its provision as many persons as are engaged in the united industries of building, textile work, and dress, all taken together.

The largest group of all those into which the population is divided, is what is called the domestic class, if it is compared with any divisions of occupation of similarly distinct character. Grouped together as a whole, indeed, the occupations ranked under the head of the industrial class engage nearly one-fourth of the entire population, of which what is called the "indefinite and non-productive class," before referred to, form 56·90 per cent. The primary divisions given in the Census may be thus comparatively stated :—

	Per cent.
1. Professional class	2·50
2. Domestic class	6·94
3. Commercial class	3·77
4. Agricultural class	5·36
5. Industrial class	24·53
6. Indefinite and non-productive class	56·90
	100·00

The very small proportionate percentage of the agricultural class is one of the most striking features of this *conspectus*. In 1831, according to the statement of Sir Robert Kane, in his work entitled "The Industrial Resources of Ireland," the respective proportions of the population were :—

	Great Britain. Per cent.	Ireland. Per cent.
Employed in agriculture	28·2	65·7
Employed in trades and manufactures	42·0	17·4
Employed otherwise	29·8	16·9

In 1871 the number of persons employed in agriculture in England and Wales was 1,561,024, including gardeners and persons occupied about animals. In 1881 the corresponding numbers, instead of being some 10 per cent. more, had fallen to 1,383,184, a decline of 177,840 persons, or more than 11 per cent. in actual numbers, coming down, as above shown, to only 5·36 per cent. of the entire population. Thus the persons occupied in the building industry now outnumber, by between 10 and 12 per cent., the roll of those on whom, but for the ministry of commerce, we should have to depend for the provision of the food of the entire population.

Another special peculiarity of the work of the architect and of the trade of the builder, is thus forced upon our attention. This is its permanence; permanence, that is to say, so long as any particular stage of civilisation is permanent. Domestic architecture is thus at once the outcome and the measure of the national wealth, using the fine old English word in its true meaning of well-fare. With stable institutions, the annual increment in the numbers of a nation requires proportionately a somewhat larger increase in the provision for housing. An addition of a number of cubic feet of house-room exactly proportionate to the increase in the numbers of the people may be said rarely, if ever, to occur. There will be either a gradual increase in the size, beauty, and architectural excellence of the architecture of a people, or, *per contra*, a decline. A sense of order and security, and the practice of lucrative industry, become permanently reflected in stone and brick, among one race, at a time when, within a few hours of travel, the abodes of another race, more ancient, it may be, in civilisation, as well as more gifted by nature with many of her noblest endowments, are degenerating into ruinous hovels. Eminently is architecture sensitive to the true law of civilisation. Very slightly is structural progress or decline affected by the great panacea of the half-taught *doctrinaire* of modern times, viz., legislation. It is not within the power of votes, given either at the hustings or in Parliament, to effect much for architecture, unless it be such a legislation as waits upon national requirement, or as stands as a sentry to prevent the permanent injury of urban growth by the overhaste to grow rich. Legislation cannot enforce taste, any more than it can create wealth; and it may be said without any hesitation that it is rather by increasing to the utmost the sense of security and unimpaired calm, than by the effecting of any manner of change, that the statesman will make any mark save a disastrous one on the contemporary architecture of a country.

Statistics are, too often, and for too many people, a dreary and forbidding province, alive with painful recollections of the never wholly mastered multiplication table. But statistics, in the hand of a master, are instinct with a romance of their own. Apart, however, from that, their value, as substituting a definite for a vague conception, is of a very high order. Is there not a difference between such general statements as,—"there can be no doubt that the building trade is a very important member of the commercial and industrial interests of the country,"—and the statement that, week after week, its operation is crystallising some 700,000*l.* worth of labour in the form of houses and monuments, churches and halls, markets and shops, docks and harbourage? And when we add the engineering works, this process goes on at the rate of considerably more than a million a week. That is a definite measure of the importance of the building craft.

No less instructive is the reflection that, counting by mouths, there is a larger demand for the products of industry made by the non-working than by the working portion of the population. It is, indeed, consistent with the old ideas of the order of society that such should be the case. Take it how we like, while the number of the truly idle who are capable of work must be very small, the number of women and children who are returned under one or another of the productive classes is unduly large. In the East, and we conclude in the savage life of the West and of the South, the men are reckoned as one-fifth of the population. It is true that much of the drudgery of domestic life is thrown upon the women, in such cases. It is the women who draw water, who grind corn, who tend the young, who discharge, to a considerable extent, the functions usually performed, among the nations of Western Europe, by beasts of burden. But for what is regarded as the occupation of men,—fighting, hunting, and whatever humble attempts at agriculture may be added to pastoral occupations,—the men are needed. In savage life, then,—to which some persons hold that we are on our way back,—the working population of England would form 20 instead of 43 per cent. of the population. The resulting 23 per cent. shows the extra resources that civilisation affords to national industry.

Another reflection follows from the consideration of the preceding figures. It is one to which a more minute dissection of them gives a greater significance. That is, the intimate dependence of public welfare, and of the happiness of the masses, on peace, security, and absence of harass and of menace. Among the industrial classes,—those who minister to wealth and luxury alone,—jewellers, goldsmiths, dealers in feathers and fur, in silks and satins, in linen and lawn and cambric, are comparatively few. If we add poulterers, and fishmongers, and confectioners, and wine merchants, and those who serve the tables, or the stables, or the homes of the wealthy and easy classes, we still do not reach more than, perhaps, 5 per cent. of the industrial classes. On the other hand, those whose services are absolutely necessary to life,—bakers, butchers, brewers (shall we say?)—are not much more numerous. The food industries are only credited with 514,000 persons engaged in these various processes. It results that the great mass of the working population follow callings of which the prosperity depends on the public sense of security. The man who is ready to lay out a large sum of money in building a house, will put it off till next year if he finds that strikes are likely to occur in the building trade. So it is with everything of which the execution is not limited to time. When times look bright, not a day is to be lost; when they look dull,—wait till next week, next month, next year. But every week's delay means a pinch to so many families. Here to us is the great lesson of the Census,—the dependence of public welfare on public order, security, and content.

Hence it is that when war, or pestilence, or domestic commotion disturbs the order of the State, the industrious classes are the first to suffer. To regard closely the nature of the occupations of the industrious classes is enough to "teach the act of order to a peopled kingdom." Only when this is maintained do "merchants venture trade abroad"; only then do our great urban hives teem with "the singing masons building roofs of gold, The civil citizens kneading up the honey, The poor mechanic porters crowding in Their heavy burdens at the narrow gate." So only "may a thousand actions, once afoot, End in one purpose, and be all well borne, Without defeat."

THE ROYAL ACADEMY.

THE Academy Exhibition of 1884 is one of considerable and varied interest. The painting, however, which is admittedly the central work of the year, the President's "Cymon and Iphigenia" (278) just fails to command that consensus of admiration which is aroused only by a complete and unquestionable success. After looking through the illustrated pamphlet on the making of the picture to which we referred the other day, the result is a trifle disappointing. The original model of the figure of Cymon, as engraved, conveyed well the idea of a commonplace youth suddenly taking in a new idea of what beauty meant; but the Cymon of the painting is a sentimental youth, not at all answering to the poet's description, and he is in part awkwardly hidden behind the sleeping figures on the right, which would in any case impair the expressiveness of pose of the original model. Iphigenia is a fine figure, in very deep sleep, and this expression of deep sleep is intensified by the attitudes of the attendant figures, who are really the most thoroughly successful portion of the work. The swell of the hip of the principal figure is surely exaggerated beyond nature, certainly beyond the requirement of beauty. The prevalent tones of the figures and drapery are exquisitely harmonious, though hardly those of any possible open-air scene; this one can allow for, as Sir F. Leighton's art is essentially ideal, not realistic; but a tree at any rate must be a real tree, and these trees are very much like scenic trees. The artist has, however, raised the subject above the vulgarity with which it has often been treated; he has aimed at giving the hallowing influence of intellectual beauty, instead of painting a satyr leering at a naked figure; and for this let him have much thanks.

The work which most completely fulfils its aim in this exhibition is again Mr. Orchardson's. "Mariage de Convenance" (341) is a moral painting which in its almost cruel satiric force reminds one of Hogarth, though in a different enough manner. Much canvas is covered, for a scene with only two figures, and we like no more than before Mr. Orchardson's peculiar prevailing tone; the two opposed figures, the prematurely old and *blasé* husband

and the young, full-blown and sensual wife, are most brilliantly and pitilessly contrasted; a contrast intensified by the solid propriety of the butler, who pours out the wine which neither cares to touch, in well-acted unconsciousness of the situation. The painting represents about the worst phase of the evil it satirises; the two personages are about equally unworthy of sympathy; but if we look at painting as a means of pointing a moral, this must be recorded as a work of exceptional success.

Mr. Millais's principal contribution seems like two separate paintings combined in one frame. It is entitled "An Idyll, 1745" (347), and represents a drummer boy in the English uniform of the period playing the fife to a small audience of three Scotch girls, seated in a nook in a wood. On the left is the mass of red and white uniform of the player, painted with almost raw realism, on the right the figures of the listeners seem to be under another light, while the sentimental expression of their faces is in the strongest contrast to the matter-of-fact countenance of the player. This part of the contrast is of course natural and effective, but seems to be an absolute want of relation between the component parts of the work which renders it as a whole rather perplexing and irritating, and suggests the idea that the military musician was painted first as a special study, with no original reference to what was to be added to the composition subsequently. Mr. Millais's portrait of Mr. Henry Irving (372), painted for presentation by the artist to the Garrick Club, will form a notable addition to the collection of historically interesting, but in many cases artistically feeble, theatrical portraits which adorn the club. It is a side face, half-length, very refined in execution and character; perhaps a trifle flattering. A more powerful portrait, in Mr. Millais's most downright style of realistic portraiture, is that of Mr. Fleetwood Wilson. Besides these, this artist only exhibits one other work, the portrait of "Miss Scott" (331), a Philadelphia lady.

Mr. Seymour Lucas, who is one of the three painters who have been "purchased under the terms of the Chantrey bequest," has painted nothing better than "After Culloden" (881), a scene in a smith's shop, where, on the left, an English officer and his party enter, and the sturdy inhabitants seem disposed to resent the intrusion with the weapons of their trade. The man who, to the right, faces the military party, is really grand in his character and pose, and yet not out of keeping with his surroundings. A gaily-caparisoned horse, tethered on the right, indicates that his rider, of whom the soldiers are in search, is not far off. On the same wall, in Gallery VIII., are two other military scenes, the "Wallenstein" of Mr. Crofts (873), and "The Guards at Tel-el-Kebir," by Mr. Woodville (866). The latter interests us not at all. In the former Mr. Crofts has repeated a *motif* in composition which he has used rather regularly, the principal figure riding up to the front amid an array of soldiers and other lookers-on. Mr. Crofts was wonderfully successful in his treatment of Marlborough in this way two or three years ago; the principal figure asserted itself as "the man." We can hardly think he has equally realised Wallenstein. The figure on horseback, taciturn and self-controlled as he seems, is too trim and quiet-looking for that brilliant, unscrupulous, and, in some respects, brutal military adventurer. For another very striking battle-picture we may go back to Gallery III. and look at Sir John Gilbert's picture of "The Morning of the Battle of Agincourt" (258), a remarkable study of the conditions depicted in Shakspeare's well-known lines.

Mr. Tadema's large work, the largest, we think, he ever painted, "Hadrian in England" (245), represents a supposed visit of this Emperor to a Romano-British pottery. The picture is oddly composed, and repeats a frequently-employed receipt of the artist, of bringing in a figure close to the spectator, in movement from one portion of the scene to the other. In this case it is an "operative" carrying specimens up a stair; on a kind of gallery above are Hadrian and his suite, the Emperor a little milder and more effeminate in appearance than the busts of him seem to justify; below we see, under the stairs, the *atelier*, the men and women in which appear a little like dolls, from want of atmospheric perspective to give them scale and distance. The brilliancy and realism of the costumes and accessories are as usual in Mr. Tadema's work; and, to say truth, it requires all this to carry off the awkward composition, or want of composition, of the whole. In the same room is Mr. Pettie's "The Vigil" (359), a painting of a Mediæval knight watching in the church the night before taking his vows. He holds his sword aloft before the shrine, kneeling on the pavement of the empty moonlit cathedral; the expression is as far earnest as Mr. Pettie can be earnest; the amount of canvas expended over the church, the architecture of which is poor and poorly painted, is very disproportionate. This picture has been bought with the Chantrey funds; we will not say undeservedly, but it is a work of rather high aim which falls short of its aim. Whether this is better than having a low aim and fulfilling it, let the philosophers settle. Of Mr. Pettie's other large work, "The Site of an Early Christian Altar" (410), the less said the better.

Mr. J. W. Waterhouse has made a real success in "Consulting the Oracle" (559), where a female priestess leans nervously down towards the mouth of a human head suspended on the wall, watched by a circle of equally nervous women, within a dimly-lighted room. It is difficult to settle what is the intended locality or nationality, nor is this of importance to the effect of the work. The picture is one which would hardly have been painted had not Mr. Tadema gone before; but it is no mere imitation of his style, and it may be welcomed as marking a success which has been achieved by patient and conscientious work, improving every year. "Sand Digging, North Cornwall" (916), by the same artist, shows that he has no mind to confine himself to one manner or one class of subject in painting.

Mr. Poynter has probably been too busy with his work for St. Paul's to send large paintings to the Academy; his "Diadumene" (368) is a very pretty, refined little nude study, framed in the midst of an interesting architectural scene, reproducing among other things some mosaic-covered columns of unusual design, for which data, we believe, exist. Mr. Calderon's decorative panels, "Cherries" and "Currants" (462, 588), for a dining-room, representing damsels picking those fruits, are neither the one thing nor the other, neither decorative nor pictorial. Among the painters of ideal and what may be called classical subjects of this kind, Mr. Albert Moore, on the other hand, knows exactly what he means to do; his "Reading Aloud" (416) is purely decorative, exquisitely so; there is hardly a trace of special expression, it is true, in the faces of the three figures, but in line and grouping, in colour and design of accessories, they form something so harmonious to the eye as to be a positive pleasure. Smaller replicas of two of the figures are in the Grosvenor Gallery and the society of water-colour artists. This is not an art which appeals to the emotions; it is superficial intellectually; but it is perfect as far as it goes, and therein lies its charm. Other figure pictures, as well as landscape and sculpture, we must return to at another time.

NOTES.

NEXT week, we understand, Lord Stratheden and Campbell will bring forward a motion in the House of Lords for the appointment of either a Royal Commission or a Parliamentary Committee to inquire into the subject of smoke abatement or prevention, and to take evidence as to the best means, scientific and legal, whereby the production of smoke may either be prevented or materially diminished. The main object is to bring what may be called "domestic smoke" under the same legislative control as smoke from mills and manufactories, or, at all events, to put the producer of such smoke under the dilemma of having either to prevent smoke or to pay for the privilege of producing it. There is little doubt that public opinion is now in a state to favour legislation on the subject, provided a sufficient body of scientific evidence is collected which will satisfy the public that the end is practically attainable. In this respect the proposed Committee or Commission of Inquiry will supply the means of condensing into one concise body of evidence the extensive and varied information on the subject already in existence, and will form what may be termed the necessary bridge to legislation. The possible methods of dealing with the subject may be grouped under two heads, viz., special fuel, or special grates or appliances. The former principle would be less complicated, probably, in its working, and more equable in its incidence on rich and poor, though there would be considerable initial difficulties in relation to vested interests. The adoption of special grates or mechanical regulators of air supply, &c., is more easy to initiate, but would present formidable difficulties in detail, especially as regards the poorer districts of London, in regard to the large total of expenditure which would be necessary to provide for carrying it out. We have no doubt, however, that once the practical possibility of having smokeless fires is demonstrated unmistakably to the public mind, the legislative difficulties will be surmounted.

THE new Archæological Museum at Cambridge, in connexion with the Fitzwilliam Museum, was opened on the 6th. Among those present were the Vice-Chancellor, who presided, Sir F. Leighton, Mr. Russell Lowell, Mr. E. A. Freeman, Mr. Burton, Prof. Sydney Colvin, &c. Mr. Lowell, in a speech marked by his usual happiness of manner and matter, suggested the possibility that, mixed race as we were, the opening of such a museum in Cambridge would stir in some one an ancestral vigour, some hereditary quality or faculty which should make him into an artist. We gave an account of the building (of which Mr. Basil Champneys is the architect) and of its origin and intent some little time back (*Builder*, Dec. 1, 1883), and shall shortly give some illustrations of the interior, showing part of the arrangement of the casts. As a collection of comparative sculpture the gallery stands quite alone in England, and is only excelled by that of Berlin. The building is an exceedingly simple one, the object being to provide house-room for the casts and antiquities, and for a lecture-room and library, &c. with strict regard to economy, and therefore little could be done in the way of architectural effect. The collection of casts, of which we shall have more to say, was got together mainly under the supervision of Professor Colvin, the retiring curator, and this portion of the establishment is now under the care of Dr. Waldstein, who succeeded Professor Colvin in his office of curator to the Fitzwilliam Museum, of which the sculpture gallery is a dependency. The general and local archæology is under the charge of Baron von Hügel.

IN the Supplement to the *Builder* which we give this week will be found full reports of the proceedings of the seventh General Congress of Architects, which was opened on Monday afternoon, when Mr. Horace Jones, the retiring President of the Royal Institute of British Architects, received the members and visitors attending the Conference. The real beginning of the business of the Conference was deferred to Tuesday evening, when there was a rather thin attendance to hear Mr. Cates's paper on "The Relations between Architect and Contractor." The paper, though embodying much interesting information, led to a discussion chiefly in one direction, and little that was new was elicited. The languor of the debate was appreciably relieved by the lively speech of Mr. Chas. Lucas, of Paris. The Conference met again on Wednesday morning, when there was a much larger attendance to hear Mr Blashill's able paper on "The Tenure of Land for Building Purposes," which was followed by a very good debate. The special meeting of Associates, held in the afternoon, to consider

questions affecting the position and privileges of that important section of Institute Members, was crowded, enthusiastic, and unanimous; and while some speakers indulged in a little banter of the "archaic" provisions of the Charter, there was, we were glad to note, an exceedingly healthy tone of loyalty to the Institute pervading the meeting. Some of the foremost speakers in favour of the reforms proposed urged that while reasonable concessions to the Associates would be to the advantage of the Associates, they would be far more advantageous to the Institute, as tending to "solidarity" and *esprit de corps*. More than one speaker was heartily cheered as he referred, in terms of unequivocal deprecation, to the proposal for the establishment of a new architectural society, and the only reference to the proposal which was not in deprecation of it was received with chilling silence.

OF the drawings which have been exhibited in the ground-floor room at Conduit-street this week, those by Street are the most instructive in regard to the production of clear intelligible detail drawings, and in regard to the realisation of the spirit of Gothic architecture by the modern architect, or by those who still hold to that as the highest aim of modern architecture. Burges's drawings are deficient in clearness and intention, in comparison with Street's, and there is a vein of eccentricity and oddity about some of the sketches, which, however "spirited," as the phrase goes, are not such as can be held up as models. In this respect, Viollet-le-Duc's sketches are quite above the others; they represent exactly what architectural sketching of details should be: clear and concise representation without labour, and by broad and well-defined handling. Taken generally, there is more of modern applicability in the Viollet-le-Duc drawings than in those of the two English architects. Viollet-le-Duc was an exceptional example of a man who ardently studied Mediæval art without becoming a Mediævalist. His detail designs represent a great deal of Mediæval excellence translated into his own forms. Some of the wrought-iron details, if compared with those among Street's "Law Courts" details, show to decided advantage; they are more original and designed with more freedom of line. In some of the geometrical drawings for large works, however, Street is shown at his very best, as well as in his many details, mouldings, &c. There is a good example of what we mentioned in an article written at the time of his decease, his habit of drawing the mouldings for all the caps of the piers of a church on one sheet of paper, all alike in general dimension, but all slightly varied in detail. This one sheet is quite a study for the young student in the designing of mouldings.

IT is not, however, quite fortunate, considering the present condition of public opinion in regard to architects and architecture, that so much should have been said at the Conference meeting on Wednesday, in honour of the uncompromising Mediævalism of Street and Burges. Unless architects are prepared to regard architecture more from the point of view of to-day, they will be more and more left behind or on one side by public opinion, not altogether that of the "Philistine." Mr. Beresford Hope, with the natural partiality of a warm friend of the late architect of the Law Courts, spoke of Street's uncompromising adherence to his Mediæval architectural faith as peculiarly honourable to him. Adherence to convictions is always honourable to a man's principles, but not necessarily to his judgment. Critics of another school would perhaps say, and not without reason, that Street had been consistently blind to the use, spirit, and requirements of the age and the purposes for which he was building, and we must entirely demur to the dictum of Sir Gilbert Scott, quoted by Mr. Aitchison in reference to Burges, that "an able artistic architect can surely make a good plan, while no amount of skill in mere planning can, in itself, enable a man to produce a noble building." The latter part of the sentence is perfectly true; but, as to the former, though one cannot prove a negative theoretically, the fact remains that those who are called artistic architects very often have not made good plans; whether from indifference or incapacity one cannot predicate, but the result is equally inconvenient either way, for those who have to live in or make use of the buildings.

AT this juncture, when the Conference of Architects is engaging the attention of our readers, it may be of interest to mention the following particulars of the first meeting of the Institute. It was on Thursday, the 8th May, 1834, that Professor Donaldson addressed a circular letter to several well-known architects, inviting them to attend "at Mr. Rainey's rooms," 14, Regent-street, on Tuesday evening, the 13th May, 1834, and at that foundation meeting fourteen attended, namely:—Messrs. P. F. Robinson (in the chair), Seward, Kay, Barry, Gwilt, Lee, Cresy, Fowler, Parker, Kendall, Bellamy, Goldicutt, Rhodes, and Donaldson,—the order of precedence here given being that recorded in the minutes. The first annual meeting was held on Monday, 4th May, 1835, when twenty-three fellows and five associates were present, including Sir Charles Barry, J. B. Papworth, Decimus Burton, and others, of whom Professor Donaldson is the sole survivor.

THE first stone of the restoration work at Peterborough Cathedral was laid on Wednesday, the Earl of Carnarvon officiating as pro-Grand Master of the Freemasons, in place of the Prince of Wales, who was to have laid the stone. There was a "special Grand Lodge" formed at the Fitzwilliam Hall, and a procession thence to the cathedral. After the ceremony, which did not differ in its formalities from most others of a similar nature, a luncheon was provided in a tent near to Fitzwilliam Hall. As elsewhere notified, we shall give next week a measured drawing of one bay of the cathedral arcade, showing the deviation from plumb and the means taken for bandaging up the pier; and we shall also be able to give a plan of one of the piers as built, showing the extraordinary style of jerry-building which might be carried on in a great structure in (to adapt a well-known Hibernianism) "the so-called Middle Ages."

WE are recognising more and more the need of providing open spaces for those who are compelled to live within our ever-growing cities. In time, perhaps, we shall also learn how best to utilise our few surviving gardens and disused burial-grounds. One consideration seems to have been overlooked in dealing with open spaces, and that is the fickleness and often the inclemency of our climate, and thus the use of such places for air and exercise is very much restricted. Why could we not have in our parks some adaptation of the Italian piazza or colonnade, for we are quite as much in want of shelter from rain and wind as the southerners are from sunshine? Such buildings, besides providing suitable protection for men, women, and children in bad weather, would be the proper home for the bare-headed statues whose forlorn condition in the streets and squares of London often moves our compassion. There would be abundant opportunities for skilful design and appropriate decoration, and there are plenty of architects in the present day who might be trusted to give us something better than the refreshment-bars of a suburban tea-garden. Again, by applying a slightly different treatment to disused burial-grounds, we should not only render them more useful and attractive, but we should also be able to dispose of a valid objection often urged against the present mode of treating the memorials of the dead. It must be admitted that the ordinary headstone,—cold, angular, and grim,—does not harmonise with its new surroundings, and hence,—in defiance of justice and the Society of Antiquaries, it is not unfrequently buried or ruthlessly carted away. But nothing could be simpler than to transfer the records of the graveyard to the walls of the cloister, and thus secure for them a far more extended existence. They could be arranged alphabetically or chronologically, as might seem most expedient, and Old Mortality could study them in sunshine or in storm without experiencing any of those difficulties by which he is now beset. If at Stepney or Whitechapel we had a humble imitation of the Pisan *Campo Santo*, would it necessarily be profaned?

ON Monday evening Mr. Shaw-Lefevre moved that the second reading of the Hyde Park Corner Improvements Bill be discharged, in order that a Bill on this subject might be introduced into the other House of Parliament, which, after some consideration, was agreed to without a division. We have more faith, on the whole, in the Upper House than in the Lower in matters of taste; however, we shall see. The same evening Mr. Lowther, in asking a rather frivolous question of the First Commissioner in regard to a chimney-pot on the Wellington arch, was a little more sarcastic than he was probably aware of, when he inquired whether the Royal Academicians had not recorded an objection to this feature as "contrary to all canons of proportion"; but Mr. Lowther's unconscious satire hits, not the Academicians, but the members of Parliament and other outside critics, who, whenever they want to find fault with anything, talk about "canons of proportion." Have any of the persons who use this phrase the slightest idea what they mean by it?

WE have received a circular from the Society which has called itself by the rather unhappy name of the "Earth to Earth" Society, headed "Reasons against Cremation," and accompanied by a pamphlet containing a reprint of various articles and letters in the *Times* in reference to Mr. Seymour Haden's proposals for interment, which are known to our readers. The paper of "Reasons" we consider in some respects a very weak and foolish one, and likely to do little good to a cause to which, however, as we have before said, we are by no means opposed. All that we say on behalf of the cremators is this, that an increasing number of people are beginning to look favourably on that method of disposing of the remains of their deceased friends; that some very high medical and sanitary authorities recommend it; that it has been decided to be legal under certain conditions; and that it is time that the Government recognised these facts and put the system under formal licence, so that it may be carried out, when desired, with decorum and without abuse. The only practical paragraph among the "reasons" is that in regard to "the medico-legal difficulty" arising in cases of suspecting poisoning, the importance of which no one ought to overlook. As a specimen of the sentimental reasons given, we may quote this:—"Because the sacred utterance from the Book of Genesis with reference to the origin and physical end of man has for four thousand years been interpreted to be a divine oracle enjoining the *burial* of the dead." We might as well revive the injunction against gathering sticks and cooking on the Sabbath day.

IF the successive issues of Dr. Baumeister's *Denkmäler des Klassischen Alberthums* equal the first number, which has just appeared, the work will be a marvel of varied excellence. It is undertaken, as the editor states, in the interest, not of specialists, but of the general educated public who need for reference a cheap and handy *répertoire* of classical archæology. It is intended to include,—1. The history of classical art in the various branches of architecture, plastique, painting, music. 2. Mythology, so far as illustrated by art. 3. Private life of the ancients. 4. Portraiture of historical persons. 5. Coins, from the historical as well as as artistic points of view. 6. Topography of all important classical sites, *e.g.*, Rome, Athens, Pompeii, Mycenæ, Troy, Syracuse, &c. 7. Organisations of classical armies and fleets. 8. Palæography. The number which has already appeared contains admirable articles on Achilles, Adonis, Adrastos, Ajax, Actæon, with numerous illustrations from vase-paintings and bas-reliefs, some not easily accessible elsewhere; a full dissertation on ancient ploughing (Ackerbau); portraits of Alexander

the Great and Æschines. The names of Dr. Julius of Munich, and Dr. Milchhöfer of Münster, among a host of others standing in the forefront of archæological discovery, guarantee the quality of the work. The numbers are to appear monthly, at the price of 1s., and to be complete in, at the most, thirty-five issues.

M. RUPRICH-ROBERT, who, besides being an "Inspecteur Générale des Monuments Historiques" in France, is an Honorary and Corresponding Member of the Institute of British Architects, is about to bring out an illustrated work on Norman architecture, the result of many years' study of the subject both in Normandy and in England. After going through a brief history of Normandy, "chiefly in regard to the civilising agency which, in spite of incessant wars and revolutions, gave rise to the building of such a number of castles, churches, and monasteries, both in the Duchy of Normandy and in the kingdom of England," the work will offer a detailed study of the monuments themselves in the two divisions of eleventh-century and twelfth-century art. The illustrations will be devoted to the representation not so much of entire buildings as of portions shown in section, plan, and elevation, and ought, therefore, to be of special value to architects. MM. des Fossez & Co. (Librairie Centrale de l'Architecture), Paris, are the publishers.

FROM the President's speech at the Royal Academy dinner, last Saturday, we learn that by next year the additional rooms will be thrown open, and that the added space will considerably favour the disposition of the forms of art which are now crowded together rather heterogeneously in Gallery X. Drawings in water-colours also are to be provided for, in a special room, "no longer a passage-room, terminating the vista of the western galleries. In the room adjoining it, works in black and white will find their place, each class distinct in the now more ample space: drawings, engravings, etchings no longer jumbled up in regrettable confusion. At the corresponding extremity of our building, on the east, Architecture will sit alone in a new and handsome gallery." May she be worthily represented! Sir F. Leighton does not hold out much hope that the added space will be available for lessening the number of rejections by increasing largely the number of paintings hung. Nor do we particularly recommend increasing the numbers. The best way of providing additional space for good pictures would be for some of the Academicians to keep their own out of the Exhibition.

ARCHITECTURE AT THE ROYAL ACADEMY.—II.

"NEXT year," said Sir Frederick Leighton, at the Academy banquet, in graceful phrase, and clear mellifluous tones, "Architecture will sit alone in a new and handsome gallery." As a matter of fact, architecture has always heretofore sat too much alone at Burlington House, and it remains to be seen whether her charms will be sufficient to attract the notice of visitors who have not the temptation of engravings and etchings to enter her new and handsome apartment. At any rate, it is incumbent upon the profession to exert themselves in order that the new and exclusive gallery designed for the reception of their drawings may be worthily inaugurated. The date of its opening is, in one respect, fortunate; for by that time the large and elaborate designs for the proposed Government Offices will have been completed and have passed the ordeal of the judges. If they are to be publicly exhibited in the House of Commons or elsewhere immediately after the decision of the Committee shall have been given, it is to be hoped that a rule of the Academy may be so far relaxed as to admit of their re-exhibition at Burlington House, where they will be seen by thousands whose love of architecture may not be strong enough to induce a special visit to a separate exhibition. This probability ought to add a new incentive to the exertions of the nine favoured architects who are now busy with this important national work, who will, it is to be hoped, put forth all their power and give us something fitting so great an occasion.

And now, before "the old order of things passeth away," we propose to take a leisurely survey of the chief architectural exhibits of the year.

Foremost amongst them in interest is Mr. J. G. Crace's "Suggestion for the coloured Decoration of St. Paul's Cathedral," No. 1,345. The drawing purposely excludes the dome, — a scheme for the decoration of which is now in competent hands. It is proposed to cover the whole area of the wall surfaces with colour and gilding,—using pictures, whether in oil, tempera, or mosaic, but sparingly, and keeping the decorative treatment in strict subservience to the architecture. The vaults and spandrels, and the panels behind the whispering-gallery, have Scriptural subjects,—such as the Raising of Lazarus, the Woman taken in Adultery, &c.; but many of the panels are shown as filled in with coloured marbles, colour only being sought. A creamy white is used for the groundwork, varied by deep reds and blues, and such features as modilions, capitals, railings, &c., are uniformly gilded. The screen is removed and the organ divided. The monuments have in many cases been removed, and the whole interior of the cathedral swept and garnished. The effect is on the whole harmonious and pleasing, and the drawing honestly represents the effect without trick or artifice. As a record of the opinions of a decorative artist of long experience and acknowledged skill, this "suggestion" is deserving of careful consideration. We doubt, however, whether *any* scheme of coloured decoration of the cathedral will not detract from its special charm of mysterious grandeur, and reduce in a considerable measure the effective spaciousness which is now one of its chief beauties. Certainly the application of colour will at first be unsatisfactory, and can only be contemplated without concern in the belief that years will, it is to be hoped, restore the aërial tones which are so precious in all our English cathedrals. To one who remembers what the interior of Salisbury Cathedral *was* and what it now *is* the advent of the decorator, be he never so skilful, cannot be regarded without some alarm.

Next in importance we must place Mr. G. G. Scott's "Interior of the new Roman Catholic Church of St. John Baptist," now being erected, at the cost of the Duke of Norfolk, at Norwich, No. 1340. The plan shows a wide nave of nine bays, a central tower, a choir of four bays, and a cross Lady-chapel prolonged laterally north and south until it accommodates no less than eight altars. There are north and south transepts, doubled on the south side, containing altars, a western porch and organ-gallery, and narrow nave and choir-aisles. The organ-gallery is reached by western turrets. On the south side of the church is a row of what must, we suppose, be taken to be confessionals, although the plan and the view appear to disagree somewhat; the latter showing an arched passage behind a metal grille. The whole is groined in stone with bands of a darker colour. The style is Transition of a very severe character, the nave piers being cylindrical and of great size. The triforium and clearstory are First Pointed, and a triplet of lancet lights fills the western gable. The capitals of the nave piers are simply carved with an incised leaf of early quasi-Byzantine character, and no other carving whatever is visible. The whole is marked by a feeling of reserved power, which is too often absent in modern ecclesiastical work, and Norwich may be congratulated on having such a noble church. Of the propriety of placing the organ at the west end of so long a church there will probably be varying opinions. There can be no difference of opinion as to the generally satisfactory effect of the design as a whole. We should, however, be glad to see further illustrations, especially a view looking eastward, and, if possible, the geometrical drawings. The promised new gallery will afford ample space in future, and we hope that architects will avail themselves of it to send something besides the perspective view, which is, as a rule, all that they now think it worth while to send.

In "St. Cuthbert's Church, South Kensington, now in course of erection" (No. 1,315) Mr. Gough has dispensed with an eastern window, as Mr. Butterfield and others have done before him; and the space usually occupied by such a window he has filled with two tiers of sculptured figures. The drawing is hung too high to enable their purport to be discovered. From the plan, which, however, does not read exactly with the view, this arrangement of the east wall has been adopted from choice, as a road runs along the eastern side of the site, and no difficulty of lighting on that side exists. The end looks rather as though an original window had been blocked up, and this form of substituted decoration used to make up for the loss of interest occasioned by the change. A *flèche* surmounts the chancel arch, but as there is a western bell-cot for three bells the *flèche* is presumably only a ventilator. The design is not an improvement on some of the same architect's work, which is marked by a breadth of treatment not seen in this example.

"The Henry Wilson Memorial Church, Carbrook, Sheffield," by Mr. J. D. Webster (No. 1,300), is a good specimen of a Late Perpendicular parish church of a familiar type, with a nearly-detached tower, of a design common amongst the churches of the West of England. The drawing is without a plan, but there appears to be nothing noticeable in this respect.

"The new Church of St. Padarn, Llanberis" (1286), by Mr. Arthur Baker, is a very effective Early English cruciform church, magnificently situated on the crown of a steep slope, richly wooded, and in every way affording an opportunity for picturesque treatment, an opportunity which the architect has fully availed himself of. The central tower is broadly and boldly designed, and the *ensemble* is in every way satisfactory, although the effect of the drawing is a little jeopardised by some indifferent tree drawing.

"St. Michael's, Coppenhall," by Mr. James Brooks (1263), is in a manner which is specially associated with this architect's name. It is quite broad and manly in treatment, and the detail is uniformly good. We may be sure that the interior of this lofty church will be equal in charm to the many similar works which Mr. Brooks has given us. The peculiar form of turret at the intersection of the transepts we have seen in his designs more than once, and the same may be said of the tower and spire. We very much admire this architect's work, and have only one complaint against him, viz., that he is always the same.

In the "Restoration of SS. Peter and Paul, Northleach, Gloucestershire" (No. 1,246), Mr. Brooks is for once working in an unaccustomed style, and apparently with complete success; but we have no plan or other indication of how much of the work is in this instance new, and cannot therefore say what credit is due to the modern architect. The church is a magnificent example of Late Perpendicular work, with a very short but lofty nave, and a very long low chancel. The south porch with a parvise is superb, and the whole structure most interesting. This subject again we should like to see fully illustrated by geometrical drawings. A remarkably wide and handsome window appears in the east wall of the nave over the chancel roof, producing an interior effect which is always pleasing.

The design for "New Parish Church, Govan" (1,254), by Mr. Rowand Anderson, is marked by the power and refinement which characterise all this architect's work. The tower and spire remind one forcibly of Mr. Pearson, and there is a suggestion of Mr. Pearson, not amounting to plagiarism, about the whole. Without the aid of a plan it is impossible to assign a meaning to the projections on the north side of the nave. No doubt they serve some necessary though unexplained use.

No. 1,240 is a curiously original design for the "Proposed Church of St. Saviour, Sunbury-on-Thames," by Mr. J. D. Sedding. The drawing shows a nave, chancel, central tower, dwarf south transept, and a low pent-house aisle passage spanned by slight flying buttresses terminated by semi-pinnacles which die away under the eaves of nave roof. In the end of the transept is a wide traceried window with Perpendicular mullions 2 ft. or so in height. It is a singular if not fanciful design, and one which we cannot very much admire, much as we generally admire this very accomplished architect's work.

Nor can we admire Mr. J. J. Stevenson's "Tower of Free St. Leonard's Church, Perth" (1,245), the leading feature of which is adapted from the well-known tower at Newcastle,—a central pinnacle supported by flying buttresses having their roots in each angle of the parapet. There is no constructive use or reason for such

an arrangement, and in appearance it is dangerously unstable. Beyond mere size, and consequent sense of power, the design offers no points for remark.

No. 1,230 comprises two views of a quiet country church, "St. Mary's, Pulford, Cheshire," by Mr. John Douglas, who has given us much excellent architecture of many kinds. This, his latest effort, has many good features, and notably an original and picturesque shingle-covered spire.

No. 1,255 is a design for a large and important church to be erected at Portsea, from designs by Mr. Arthur W. Blomfield. It is Late Perpendicular in style, and is to be built in flint. An eastern vestry is provided, and this is, we think, a peculiarly appropriate position for this adjunct, and one sanctioned by precedent. The design is artistic in grouping and masterly in treatment of detail. A lofty western tower forms a noble feature, and the large and elaborate tracery windows are effectively and well designed. The church will prove a handsome addition to a town which has lately been busy in church building.

Mr. Sulman, who has done much to impart an agreeable character to Nonconformist church architecture, has a picturesqne and appropriate design for the Presbyterian church at Stoke Newington (No. 1,223), lightly and elegantly sketched in. It repeats forms and arrangements with which his previous works have made us familiar, and if without any decided originality, is decidedly free from all offence.

No. 1,320, which must conclude our notice of this part of the Exhibition,—the Gustaf-Adolfs Kyrka, Liverpool,—a bold and original design, drawn in Mr. Pite's vigorous manner, has already been illustrated in our pages.

THE INTERNATIONAL HEALTH EXHIBITION.

THE LONDON WATER SUPPLY.

THE idea of a collective exhibit of the water supplies of the metropolitan districts having been suggested, a circular was issued by H.R.H. the Prince of Wales, as President of the Health Exhibition, to the chairmen of the various companies. Compliance being accorded, a committee was formed, under Col. Sir Francis Bolton, and with it was associated the engineers of the respective water-works, to put this idea into practice. In the present unfinished state of the building designed for this purpose no adequate judgment of the final result can yet be formed, but it is clearly the desire of those concerned to make it one of the most attractive features of the Exhibition. The intractability of pipes and pumps, and of plans and tabular statistics, made itself felt at the very outset of the undertaking; and the committee, having classified the objects, found "a difficulty in investing them with artistic merit." Abandoning, therefore, the matter-of-fact specimens, the historical and statistical particulars, and the filtrations and analyses to matter-of-fact treatment, the committee have turned their utmost efforts upon the production of a "Water Pavilion," and have carried out its design and its decoration upon the conception of assimilating it, as much as possible, with the characteristics of the rivers Thames and Lea, and the general sources of the water-supplies. The building has been given an octagonal form, so that each of the eight contributing companies should have an equal share, and the leading ornamentations spring from what are described as "eight architectural willow-trees," the branches from which meet and intertwine on the apex of the dome which roofs the edifice. In the centre of the interior court is a fountain of cast iron, in which the jet rises from the mouth of a swan, whose neck is clasped by a chubby boy, and the surrounding basin, of Portland cement concrete, is decorated with lilies and other water-plants. The floor is paved with blue marble mossic; and the frieze and border of the walls, having silver and bronze grounds, are painted with water birds and flowers. The roof is coloured in resemblance of the sky, and on the whole interior surface Lincrusta-Walton is employed in imitation of carved and fluted cedar. The entrance to the pavilion on the east is by a Gothic arch, composed of mains, pipes, joints, and bends, and at each angle of the four doorways is a section of the filter-beds in use by each respective company, the filtered waters from which are conveyed to eight corresponding drinking-fountains. In addition to the structural decorations there are views representing the various intakes and waterworks, by Mr. J. H. Hooper, an artist well known for his paintings of Thames scenery. Upon the structural decorations Messrs. Grieve and Lebhart, the scene-painters, and Mrs. Walroth, have been engaged, and cost has not been spared in any way upon the execution of the work. The practical details of the water subjects have none the less been properly regarded, and plans of the waterworks, examples of mains from 13 in. to 4 ft., water-fittings of houses, meters, and hydrants are duly shown,—for the most part in the external corridor surrounding the central edifice. There are tables also of statistics giving the numbers of miles of mains, the quantities of water supplied, and analyses of the quality of those supplies, and the amounts of income, capital, and dividends. Moreover, there is a laboratory and a library attached, where in the one the apparatus and systems of testings may be seen; and, in the other, all the principal literature of the subject may be perused. Beyond all this, a special catalogue is in course of printing, which, when published, will become a veritable, and no doubt very useful, treatise on the "Water Question."

It might have been as well, perhaps, if the Committee's energy had ended in contentment with the surrounding pretty garden and the ornamental iron gates which close it in, and to have limited their use of the indispensable electric light to the illumination of the glittering and painted interior of their "Water Pavilion." But they have elected to mingle electric lighting, pyrotechny, and fountains together, and to combine the efforts of the water companies with those of Mr. Pain. In the great basin in front of the Albert Memorial there are to be jets and cascades illumined by hidden electric lights, and in their own Pavillion Garden are to be pyrotechnic devices, including a monster revolving-wheel, some 30 ft. in circumference, with illuminated shields and plumes as adjuncts. In the cascades and jets the lighting is to be attempted internally in the water stream, so that the bright rays shall be carried over in its course; and experiment are being made to try the practicability of effecting on a large scale the oft-repeated experiment performed in elementary lectures upon light.

The water companies which contribute are the Kent Waterworks, the New River Company, the East London, the Southwark and Vauxhall, the West Middlesex, the Grand Junction, the Lambeth, and the Chelsea waterworks.

THE ARCHITECTURAL ASSOCIATION.

THE eleventh ordinary meeting for the present session of this Association was held on Friday, the 2nd inst., Mr. Cole A. Adams, the president, in the chair.

A letter was read from the Royal Institute of British Architects, stating that at the final meeting of the approaching Conference, on Friday, the 10th inst., it had been decided to associate the members of the Association with those of the Institute. The paper to be read and discussed would be by Professor Kerr.

The death of Mr. W. J. Lander, a well-known member of the Association, was announced. Mr. Lander was a very hard worker, and had taken several prizes.

The Chairman, in calling upon Mr. A. Beresford Pite to read his paper on "Cathedral Planning," stated that Mr. Statham had engaged to read a paper, but owing to press of business he had asked to be excused on the present occasion. The Council then applied to Mr. Pite, who, on short notice, had kindly consented to fill the gap. Mr. Pite had always taken a great interest in the work of the Association, and, doubtless, his paper would be one which would long live in their memories.

Mr. A. Beresford Pite then read his paper, a portion of which we print on another page.

The Chairman, in opening the discussion, remarked that although Mr. Pite had spoken of his paper as a hurried one, the thoughts which it contained must have taken a long time to evolve. The paper showed it was the result of experience, and contained an amount of original thought and criticism which was remarkable as coming from one so young. He felt some hesitation in criticising the paper, as it was one of those which he would like to read and think over at his leisure. He understood Mr. Pite to say that he did not attribute much importance to the symbolism conveyed in the Latin cross in connexion with our cathedrals. This certainly came new to him, for he had almost accepted it as a canon of faith that the Latin cross formed an important element in the design and position of the church. To his mind it appeared to be one of the most beautiful of symbolisms, which he did not at present intend to give up. He could hardly believe that it had been merely adopted for the exigencies of planning or effect. There must have been a deeper feeling running through it,—a belief that the cross upon which the Christian religion rests, was the foundation and plan of the building.

Mr. Stannus said they had always looked upon Mr. Pite as one of the free-lances of the Association, and a man of undoubtedly original ideas. He (the speaker) believed that the artistic capability had a great deal to do with the cruciform plan. Even in the planning of an ironwork market-place, if a cruciform design were adopted it added beauty to the whole building. In our English cathedrals orientation was an important factor, much more so than on the Continent. Before the Reformation, when the worship was intimately connected with numbers of saints, it was necessary to provide specially dedicated chapels in the cathedrals, which should look to the east. The east sides of the two transepts were, therefore, utilised for this purpose, and this was borne out by reference to the plans of Peterborough, Salisbury, Lincoln, and other cathedrals. He had heard, as a reason for the second transept, that it was supposed to represent the label put on the head of the cross, but he believed it was rather to supply more chapel accommodation. The Cross of the Holy Spirit was a Latin cross with another cross above it, and that might have something to do with the double transept. Mr. Pite had said that the cross was universal in planning cathedrals, but the basilicas of Rome showed a different planning. The dome at that time had not come into use, and the cruciform shape gave capabilities for a dome or central tower. Mr. Street's grand idea of having the Communion-table under the dome of St. Paul's, if carried out, would have given a significance to the dome which nothing else would give. There were few men better suited to speak on a subject of this kind than Mr. Pite, to whom he would like to propose a vote of thanks.

Mr. Martin believed that the cruciform shape was symbolic, and that the artistic reason for its adoption was quite secondary. He seconded the vote of thanks.

Mr. W. J. N. Millard hoped that on another occasion Mr. Pite would give them his ideas for a modern cathedral.

Mr. J. A. Gotch would like to hold on to the symbolical theory of the cross. He hoped that some day Mr. Pite might produce a plan for a new cathedral for Liverpool or some such place.

After a few remarks from Mr. Hunter, the vote of thanks was put and carried by acclamation.

Mr. Pite, in reply, said that four points had been raised in the discussion. As to the Latin cross he had given three reasons for its adoption, and none of the speakers had met one of these reasons; they had merely asserted what was the warm feeling of every architect. Orientation had long been practised in England, for even Stonehenge orientated. He had treated the cathedrals from an æsthetic point of view, as beautiful works containing beautiful forms and proportions; and had kept clear of archæology. As to a modern cathedral he had some sort of idea of piling one building on the top of another, but he did not yet know which two buildings to choose.

The proceedings then terminated.

The eighth afternoon visit of the Association was made last Saturday, the 3rd instant, when the members assembled at the new City and Guilds of London Central Technical Institution, situate in the Exhibition-road, South Kensington, and immediately adjoining the International Health Exhibition. The members were received in the entrance-hall to the College by Mr. T. Streeter, the clerk of the works, who conducted them to the mechanical workshops in the basement, which are covered and lighted by sky-lights. Here was displayed a large number of working and detail drawings, at once explaining the general and minute arrangements of the building. The foundation column was laid by H.R.H. the Prince of Wales, July 18, 1881, and the college was designed and built under

the superintendence of Mr. A. Waterhouse, A.R.A., architect. The foundations were executed by Messrs. Munday, and the contract for the superstructure was undertaken by Mr. H. Lovatt, builder, of Wolverhampton, the cost of the building being 70,000*l*. In the basement are also the apparatus, boilers, and machinery for heating and ventilating the whole building, which have been executed by Messrs. J. L. Bacon & Co. The entrance-hall and principal staircase form the central feature of the interior of the college; these are encased internally in Burnmantoft's faïence ware by Messrs. Wilcock & Co., of Leeds, and present a very attractive appearance. The entrance-hall and principal corridors on the ground and first floors are paved with marble mosaic paving by Messrs. Burke & Co. A large view of the front elevation to Exhibition-road, which has a frontage of 300 ft., together with a ground-plan and a general description of the building, will be found in the *Builder* of January 5th last.

ON CATHEDRAL PLANNING AND SOME CATHEDRAL PLANS.*

WE are scarcely free to-day from the charms of the Middle Ages, the earnestness and affection that have characterised the revival of Mediævalism by the great men whom some of us have been privileged to know before their work was done, possess great attractive force, though, perhaps, now falling short of infectiousness as we move away from them down the stream of time, and become more and more involved in our own struggle of life.

The gentle influences of culture, and that breadth of sympathy which characterises our age, were gradually regaining for the hitherto despised and neglected Gothic architecture that share of the affection which all true artists entertain for earnest art, of whatever epoch or people, which was hers by merit. When the Tractarian movement, with its revived Church orders and ceremonies of the Middle Ages, suddenly invaded the province of architecture, and filliped the Gothic styles and arts into an extraordinary popularity, a popularity strong enough to blind the eyes of architects to the beauties of all art that was not Gothic.

Happily architecture at present is without the immediate prospect of such another intrusion, and it is rather in fear of the reaction which invariably follows such sudden invasions that I wish to draw attention back to our cathedrals, not for a fresh dissertation on their origin and development, or for an exposition of their various parts and services,—for these have been so fully dwelt upon, one might almost say exhausted, in spite of their deep interest, by those men to whom reference has been made,—but to observe them as works of architecture, pure and simple, trying to ascertain, apart from the delightful association of their history, what artistic lessons we may derive for our benefit.

Architecture being an art (as well as the science that supplies a want in the most skilful way), the greatest achievements of the architect are those in which, inspired by love to his art, he has striven solely to accomplish the noblest and best work, as in the more abstract sister arts of painting and sculpture, above and apart from all subjective considerations, though he may have the highest subject for his exercise,—the planning of a cathedral.

A little consideration will show us that there are three principles that rule all cathedral plans. Firstly, the cruciform plan; secondly, that emphatic element of plan, the stone vault (remember, the vault of a cathedral is seen on plan to the greatest extent); and thirdly, and closely connected with the vault, is the principle of nave and aisles,—that is, a central aisle and an indefinite number of side ones.

I shall be unable to-night to deal with the great question of vaults, or how far they actually are responsible for cathedral plans, as we find them; but propose to regard the plan as a work of fine art, complete in itself, treating of the relative proportions of its parts, and their harmony one with another. This brings us at once to that which we have said is the first element we find in all cathedral plans, viz., the cruciform.

Here I will observe that in dwelling upon what has been done in the past and the invariableness of plan that is so apparent, I am far from desiring to appear to forbid any departure in the direction of originality for the future. Our future cathedrals, now that we have the plans of the world before us, are too large a subject to be even referred to now, though it would furnish a prophet who was duly impressed with the possibilities of genius, with an almost inexhaustible theme. The Latin cross is the root common to the plans of all cathedrals built west of Byzantine influence. From the earliest days when Christianity ripened into sufficient strength to adapt existing buildings to her use on to the Middle Ages, when nations vied with each other in making the cathedrals of their land triumphs of architecture and treasure-houses of all the arts, devoting to their construction and adornment enormous treasure, and not even sparing trouble to obtain the help of architects and men of genius from foreign lands, down to our own days, when we build cathedrals under such strangely different circumstances, with means obtained often in the smallest quantities and by the greatest exertions. Over this long period the Latin cross has held its own as the basis on which the cathedral is to rise. Its reign (as far as the Western Empire is concerned) has been undisputed; architects, and all on whom the origination of a church of any magnitude devolved, seem to have submitted their plans to it without a murmur.

The tremendous revolution of taste which recreated all arts at the Classic Renaissance in the fifteenth century, left undisturbed the ancient plan. The most thorough revivalist of principles and details made his earnestness for his art second to his adherence to this tradition. When the Renaissance style, which began by affecting small Mediæval ornaments, had spread throughout the entire system of the edifice, had shaken off all Gothic ties, and become really original, the reign of the cruciform plan remains stable. We see this remarkably illustrated in the three plans prepared for the rebuilding of the old basilica of St. Peter at Rome, by Bramante, San Gallo, and Michelangelo; each one departs further from the Gothic types, till Michelangelo succeeded in carrying out his boast, that he would raise the Pantheon upon the top of the Temple of Peace (the largeness of idea and grasp are characteristic of the true admiration he possessed for the Classics,—a rather different spirit and method of reviving bygone styles than that to which we have been accustomed in this century); but the cruciform remains the plan of St. Peter's, and of all the Renaissance cathedrals.

It is the same, to the evident trouble of the architecture, in Sir Christopher Wren's design for a Protestant cathedral of St. Paul, as it is also in the present building, erected for a more elastic ritual; we find it in Les Invalides of Mansard, in the Ste. Geneviève of Soufflot, and in our own times it holds its own in spite of the originality that is imported into all branches of design by the competition system.

We have before us a series of buildings, the work of the most civilised nations of the world, the growth of a period of over 1,500 years, which, though they are bound by strict but almost intangible bonds to a particular scheme of plan, and were built for an almost uniform service, are most diverse from one another. Varied and wonderful as are the beauties and aspects of nature which tell of an Infinite Creator, they are scarcely more varied or beautiful than the works of man, who alone of all His creatures is endowed with creative faculties by the divine power of design. The variety of cathedral plans is astonishing, and *the variety in that variety*, of almost all architectural forms, is equally remarkable, as a glance at the ground-plan of either Lincoln or Ratisbon cathedrals, as examples, will show us. Besides the many square proportions given in the nave and transepts, polygonal and circular forms are represented in the chapter-houses and chapels, vistas of the cloister alleys give relief to the impressions produced by the colonnades of the interior, the smaller parts and details of the choir to the larger features of the rest of the building, and so on in varying contrast.

Having glanced at the fact that the adoption of the cruciform plan has been and is universal, we may next consider what reasons present themselves to account for this.

The first is that it is the result of a definite tradition that the shape of the cross of Christ should be the foundation of the buildings erected for the use of His church,—a tradition that has derived additional force from an unbroken string of precedents. Second, that it was adopted and used for its undoubted convenience of arrangement. And the third, that its artistic merits are strong enough to account for the fact in question.

I am inclined very strongly to be of the opinion that the first-suggested reason has had very little to do with the point we are considering. Among other reasons, if the tradition of the necessity of the actual foundation of the material church being the form of the cross had such weight as some would have us believe, why was it not extended to all churches instead of only being applied to large ones and cathedrals? There is too great a tendency to make the outward and visibles of religion do the duty of the inward and spiritual, and to this tendency, wrong as it is, the value given to the tradition must be due. Again, if it was considered proper that the cross should be so important and of such moment that the plan must be conformed to it, its moment and importance would be made more forcible and real to the worshippers who needed impressing, and to whom only the elevation of the building appeared in which the cross only appears as an ornament and plays no fundamental part in the design. And we find, as I have noticed, that Protestant churches built in times when such symbols and traditions were warmly disowned, adhered to the same plan, which would not have been the case if any known superstition attached to it. Firmly as I believe that the Cross of Christ is the starting-point of all real religion, and that the future of mankind is indissolubly bound up with it, I am compelled to disconnect it with the cruciform planning of cathedrals.

The second reason, that of the convenience of its arrangement for congregational worship, no doubt had not a little to do with the popularity of the plan, but these conveniences were so persistently disregarded (with isolated exceptions of course) in the arrangement of the churches for service that it cannot have been for this reason (though other nineteenth-century echoes might object), that its use is universal. Observe the fine position in the crossing for the focus of the service. The congregation can be grouped all round in manageable detached bodies in the nave and transepts, with the singers behind in the choir, all being well able to see what is going on. It may be remembered that Mr. Street expressed his firm opinion at the time of the alteration and removal of St. Paul's screen, that under the centre of the dome, at the crossing, was the proper place for the Communion-table. Were this arrangement generally adopted our cathedral naves would become integral parts of the church and not be used on rare occasions only.

However, the cathedral builders instead of making the best use of the plan, cut off the choir and chancel by enclosing them with screen walls, not in the centre under the lantern, but away by themselves, and the table is pushed away in front of them into the mystery of distance. A notable exception is St. Peter's, at Rome, where the altar is in its best place, but this cathedral, owing to its vast piers, must be unusually defective in congregational comforts, and, in all probability, it was done for the last of the three reasons which we have now to consider.

Thus we are driven to the conclusion, and a not unwelcome one, that the cruciform plan owes its adoption to its artistic merits and capabilities. Its invaluableness to our Gothic cathedrals we are all conscious of. The Renaissance and Classic architects, who could afford to lose sight of Gothic architecture as an art and regard it as a barbarism, knew that they could not do without its artistic help. It is in vogue nowadays, perhaps for the sake of a little tradition, more convenience, and a little art. Or more likely still, the fact that the Goths used it is sufficient for us without troubling much further.

English architects seem to have grasped with a firm hand the artistic qualities of the cruciform plan. We have Lincoln Cathedral as an example to-night,* and perhaps it might be difficult to find one more complete in itself, or more typical of our national peculiarities. As a mere ground-plan it is a work of fine art, well proportioned and interesting, with beautiful forms employed about it. The foot of the cross is sufficiently deep to balance its great length, being formed by the two western towers, and transepts; these latter are of little or no use to

* By Mr. A. Beresford Pite. Read before the Architectural Association on the 2nd inst., as elsewhere mentioned.

* See lithographed illustration of various cathedral plans.

the nave as transepts; both are closely screened off, and used for the independent purposes of a morning chapel and a consistory court. They have less still to do with the elevation, being only of the same height as the side aisles; but, as we shall see, they have a distinct architectural value on plan.

The nave has seven bays, the two westernmost ones being narrower than the others, originally, without doubt, because it was built from the choir to meet the older Norman work of the front,—observe the Norman nave as seen between the towers was narrower than the present one,—but these two narrower western bays bring the transept vaults, of equivalent width, into harmony and connexion with the side aisles, and are very beautiful specimens of groining. The dimension of these two nave bays governs the projection of the transepts, which we feel to be the just one, as it is base enough to balance without rivalling the great crossing. Remember, if we were dealing with a cross in upright elevation, the base would bring the cross on to the ground-line, which carries the eye away beyond the projection of the arms. The screens which divide the nave from the chapel and consistory court are original work, not later additions; notice their value to the whole plan; they carry the nave at its normal width past the transepts, till it butts against the towers. Though the transepts only effect a junction with the side-aisle vaults, and do not pass the main arcade, you will see by a look at the plan how the nave would have been shortened and its proportion to the whole lost, besides the creation of a western rival to the great transepts, had these low stone screen walls been omitted from the plan.

For the sake, therefore, of its hidden beauty, and also for that of the architect, who brought the older building into union with his, with such consummate skill as to make a perfectly-proportioned plan out of two incongruous parts, we trust that these screens may yet escape the hands of "unbroken vista" lovers. Before we leave the west end observe how artistically the octagonal turrets turn the corners of the front; they are poised in an unusual way, having but little projection on the front, and considerable at the sides and back. This may be merely because the front pre-existed of a fixed width, which did not agree with the dimension that governs the western transepts.

In all probability, one of ourselves, a modern architect, would have made our transepts extend just a trifle more, so that those pinnacles should stand at the exact angle of the building. It seems to us to be the right sort of thing to do, but then the valuable "claw" which they exercise on the plan would be lost; as they stand they furnish us with fixed points from which we can comprehend the scheme of the base. It will be seen that this is not exaggerating the importance of accidents, or of features that may have been designed without any relation to the plan, only for their primary value to the front in elevation, when we turn to other examples and find the same results obtained by similar means.

Peterborough has a small plan with a very simple outline, as there is distinctly no feature to interrupt the cross; it is in this simple completeness unique, and contrasts remarkably with the plan we have been just considering. Its proportion as a whole is very good. If there is a fault, it is that the upper part of the cross is a trifle too long; half the width of a bay of the Lady-chapel might be spared.

It is to be observed that in nearly all English plans whatever may have been the original length determined on, subsequent alterations have pushed the building eastwards, generally with the happiest effects, as this otherwise inordinate extension of the upper part was made proportionate by such successful expedients as choir-transepts, or by a diminution of width in the presbytery, or by a more considerable one in the Lady-chapel beyond; also by the accentuation of the main crossing with the same purpose in view as at Ely and Winchester.

The western transepts, which form the *raison d'être* of the Peterborough façade, are like those of Lincoln in one respect, being of little projection in proportion to their depth, their dimension being the width of the side aisles.

They are divided from north to south by the wall which gives recess to the front and produces a very beautiful effect on plan. It reduces the western transepts to a width which makes them a base or plinth to the cross. At Lincoln the base of the cross is formed by the square subdivided masses of the towers. The western transepts, as we have seen, counterpoising the greater transepts with the entire length of the church, the screen walls purposely preventing the foot or plinth of the cross from being realised in order to preserve the effect of the nave. The Peterborough nave is long enough, and the transepts consequently can become not merely an external counterpoise to the other masses of the building and be partly absorbed by the nave, but have a definite relation to the idea of the cross, as its foot. The total depth is just as necessary to the whole, and what is superfluous to the plinth is cut off by the cross wall, and becomes the glorious (the term is not too strong) recessing to the arches of the façade. This is the secret of the mystery of the front. Anything but a hollow sham having no relation to the whole, it is in fact the result of a masterly and beautiful plan. The towers which bound the front are delicately and subtly stepped forward, with almost the effect of a curve, and form the lower feet from which the cross rises firmly and gracefully, the broad splaying of the arches and the recesses behind aiding this impression; the later porch which projects beyond is fortunately cut off on plan by these recesses. Peterborough is the only cathedral plan I know that can be looked at in upright elevation with an entirely satisfactory result.

Salisbury, though on a smaller scale, is a plan of similar proportions and scheme to Lincoln, but without the western transepts. It was built a short time after the nave of Lincoln, in 1220. It is a double cross, having transepts of the same relative projection, and there is but little difference in the proportionate lengths of the choir and presbytery. The scheme of the cloisters and chapter-house is also similar, but they are in a position which the exigencies of the site did not permit at Lincoln, on the south side of the nave,—the more usual position. To a certain extent, perhaps, this position may give a finish or balance to the western end of the cathedral, on the south side, but something seems needed on the north. The porch would scarcely supply the need, or be important enough for the position. The length of the nave without being interrupted needs the balance and base that the western transepts give to Lincoln.

A comparison between the two cathedrals in these particulars is the more justifiable, as both the west fronts are designed on the same principle, being façades, distinct architectural compositions complete in themselves, like framed pictures, with corresponding turrets at the ends. These turrets are not pitched on the intersection of the front and side, on "the correct angle," but are placed as terminations to the front, though they have not enough projection in spite of this, on the plan, to furnish us with the points that the Lincoln turrets do, and we consequently miss its completeness and beauty in this respect. A visitor to Salisbury feels that there is a lack of interest at the farther end of the nave, especially after turning away from the choir, it seems too long a walk. The very fine old stained glass in the western windows is a strong attraction, doubtless, but cannot atone for the architect's apparent lack of resource in allowing his nave to become monotonous. It cannot be that he was unwise enough to design that this impression should be produced, to increase the effect of his west front, *tour de force*, awaiting one beyond the welcome door. It must be remembered, in criticising Salisbury, that it is practically the work of a single mind and generation, being one complete erection,—at all events, as far as the plan goes. This is scarcely the case with any other of our cathedrals of Mediæval age.

We will not stay to consider at such length further plans, having taken our types. We have only to notice variations or developments.*

Entertainments for the People.—Miss Emma Cons is throwing much energy into her management of the Royal Victoria Coffee Hall, and, besides providing "variety" entertainments on other evenings of the week, has arranged for a series of ballad concerts on Thursday evenings during May, which will be conducted by Madame Mina Gould and others. M. Lubinoff, a Russian tragedian, is arranging for some costume recitals in June.

* To be continued.

THE STUDY OF EARTHQUAKES.

THE following is extracted from a paper on this subject, read by Mr. H. Lefevre, at the Royal Aquarium, last week:—

Notwithstanding the frequency of earthquakes, and although we have at our disposal accounts of many thousand instances of such disturbances of the earth, there still remains a great deal to be done before we can thoroughly understand the real nature of the phenomenon, together with its effects and relations with other natural phenomena. It is only within the last few years that this study has made any steps in advance, but this progress is of so important a character that we may hope soon to arrive at a solution of some interesting questions in this chapter of natural history.

From the impression produced upon our senses, and from its mechanical effect, three different kinds of earthquakes are distinguishable.

1. The disturbance or vertical shaking movement of which the shock is from below upward.

2. The disturbance or horizontal concussion with a lateral shock.

3. The undulating movement during which the ground oscillates as if it were agitated by waves.

By a few examples, let us give, in the first place, an idea of the mechanical effects of these phenomena. In 1783 an earthquake took place in Calabria,—the summits of the mountains in many places disappeared and their outline became distinctly changed; lakes were formed by the fallen ruins, which enclosed the valleys as with barricades; houses were hurled into the air as if projected from a mine; the paving stones of the streets flew through the air like balls from a cannon: while at Rio Bamba, in 1797, the bodies of the dead were torn from their tombs; several hundreds of persons were thrown into the air and their dead bodies fell upon the summit of a lofty hill on the opposite side of the river. In Chili a flagstaff of enormous size was seen to be deeply imbedded in the earth, having been violently wrenched out of its place. As regards the undulating movement here are some examples, descriptions of which have been given and authenticated. Some trees were bent so much that their branches were broken by striking the ground, while at a distance could be seen through the long avenue of trees the progressive march of the wave. In 1811 Missouri forests were observed to oscillate like cornfields beaten down by a storm. In 1870, at Battang, in China, the ground was moved at first like the sea in a calm, and in another moment like the ocean when lashed by a hurricane.

On the 26th of March, 1812, the ground at Caracus resembled a boiling liquid. On the 7th of June, 1692, at Port Royal, Jamaica, men were hustled about, thrown one against another, and grievously injured. Earthquakes are occasionally accompanied by cracks or rents in the ground, which either remain open, or almost in a moment close again, as at Port Royal in 1692, when people were seen to be swallowed up in the fissures, and in some instances hurled up into the air, crushed and mutilated. In the earthquake before referred to, in Calabria, houses, with all their occupants and contents, disappeared in chasms, some of which instantly again closed over them, while others remained open. At Lisbon the entire quay, on which thousands of the terrified inhabitants had taken refuge, suddenly sank beneath the waters of the Tagus, to an unfathomable depth.

The same classification into concussion or shocks and undulating movements is quite as applicable to those faint tremulous rumblings we read of, which are scarcely perceptible to the senses, as to earthquakes on a grand scale, which cause such frightful disasters.

Let the earthquake be ever so violent, or ever so slight, whether it be attended by a shaking or by an undulating movement, by a single shock, or whether consisting of several in succession, it is in general accompanied by a prolonged quivering. As regards quiverings of the earth perceptible to the senses, if we employ instruments sufficiently sensitive we almost always, and almost everywhere, trace them to some perturbations which are either slight shocks of earthquake, or the reverberations of some far distant, or are, in short, due to external causes of some kind.

Earthquakes are more violent in the superficial strata than in strata that are deeper; that

is probably due to the fact that the former are more elastic, owing to the absence of external pressure. At the bottom of the shafts of mines, tunnels, &c., one hardly feels them; indeed, they are often not felt at all. The shock is transmitted very differently, according to the density of the strata; thus, along thick layers of alluvium or detrition the disturbance appears to travel with the same difficulty as the vibrations of sound travel along sawdust.

On the other hand, in the localities whereon a compact mass of rock a thin movable layer of earth reposes, this latter shakes and vibrates exactly as sand does on a table when a piano is played. Thus at Lisbon the ravages were greater in those districts where the alluvial stratum is than at Berlin and Breslau where the strata is thick, and where earthquakes are very seldom perceived, and when they occur are uniformly slight.

It often happens that the same shock is felt very differently in localities situated under identical conditions, and quite close to each other. One house is overturned, whilst its neighbour remains untouched (as, for instance, in Syria, in 1837). In other cases, on the other hand, the same effects are experienced over a great extent of country. Thus, on the 16th of November, 1827, every place situated between Ragota and Sapaya, throughout a length of 1,500 kilomètres, was destroyed in the same manner. In 1856 the whole of the countries bordering on the Mediterranean, from Syria to Corsica, were shaken; while the Lisbon earthquake was felt, it was said, over a very small area. This was so with a shock which in March, 1879, threw out of their beds the inhabitants of Leuthall Glaris, which extended to the eastward scarcely as far as Renos, and was not felt at all either to the north of Glaris or in the southern portion of the valley of the Upper Rhine. It appears that it is sometimes valleys and sometimes mountains which limit the extension of earthquakes; but the number of shocks which have traversed an entire Alpine chain is by no means small.

The shock of earthquake is propagated with a velocity of from 350 to 500 mètres a second. In some exceptional instances this rapidity rises to 800 mètres, or is diminished to 150 mètres a second. This average is about the same as the average velocity of sound, which is 340 mètres a second.

Earthquakes are also felt on the water; a ship is shaken as if it were upheaved, her moorings are unfastened or detached, her masts broken, while no extraordinary movement of the water is observable. At other times, on the contrary, sometimes for several minutes and for some hours after the shock, the most frightful bores or upheavals of the sea are seen, which, being caused by the earthquake, ravage the submerged coasts and are frequently transmitted to an immense distance. It was by a wave of this kind that Lucia was totally destroyed in 1724, not a single inhabitant surviving the disaster! Ships were thrown over the walls and the ruins of the city, and hurled a distance of three miles from the shore into the interior of the country. Lakes, in the very heart of continents, are also sometimes violently agitated. Nearly the whole of the Swiss lakes were thus affected by the Lisbon earthquake, and their waters rocked about just as when water in any ordinary basin is shaken.

Some accidental phenomena frequently accompany earthquakes; for example, subterranean noises. These noises have been compared to thunder, to the clanking of iron chains, to rolling or rumbling noises deep down in the earth.

These subterranean noises are occasionally heard at the very moment of the shock. They often precede or follow it. Cases can also be cited remarkable for eruption of gas and smoky vapours, with peculiar odours, or fountains of liquid mud or water leaping up through openings in the ground.

It is not infrequent to find the atmosphere very highly charged with electricity; at other times electric lights are perceived, and the magnetic needle is seen to be in agitation.

Earthquakes are rather more frequent during the nighttime than during the day, and in autumn and winter more so than in summer. The influence of the position of the moon appears to be insignificant, though not altogether nugatory.

There are often earthquakes without any eruptions, and also very violent eruptions without any earthquakes of importance. The Alps also, which are really an earthquatic zone, present no trace of volcanic action. The most violent and the most extensive earthquakes on the surface of the globe are in general unconnected with volcanic phenomena.

THEORY OF EARTHQUAKES.

Questions relating to them, and how to solve them.

If we desire to ascertain the cause of an earthquake, we must above all things determine the point of departure which we call the "focus." To localise the "focus" of certain earthquakes, their position, their depth, their relation to the local structure of the strata of the earth, has been labour of the last fifteen years. Down to the present time these methods have been employed to arrive at this result.

1. To determine the focus by studying the degree of intensity of the shock, as it is evident that the intensity of the shock is uniformly stronger near to the focus than at a distance from it.

2. To determine the focus by studying the exact time at which the shock occurs, as it is manifest that, when there is an earthquake, the disturbance of the ground commences in the focus itself, and that it spreads itself gradually to a distance.

EARTHQUAKES IN GREAT BRITAIN.

History informs us that volcanoes existed in the Hebrides and Wales. Earthquakes, indeed, appear to be more frequent here than is generally thought. Up to 1858 no fewer than 255 shocks have been recorded, to say nothing of those that have passed by unnoticed by reason of their slightness. According to a list as early as the year 974 there is a note of an earthquake, and in 1101 William of Malmesbury relates that all England was terrified "with a horrid spectacle, for the buildings were lifted up and then again settled as before." Thirty-two years later many houses were overthrown and flames issued from rifts in the earth; and in 1185, according to Holinshed, "stones that lay couched fast in the earth were removed out of their places, houses were overthrown, and the great church of Lincoln rent from the top downward." On the 12th September, 1275, St. Michael's Church, in Glastonbury, was destroyed by an earthquake, and in 1361 there was a similar visitation. So frequent were shocks in her time that Queen Elizabeth caused a special form of "earthquake prayer" to be issued. There is an unconfirmed tradition that in the fifteenth century Lyme Regis was nearly destroyed. On Easter Monday, 1580, the great bell at Westminster and the bells of the various churches were set jangling; the people rushed out of the theatres in consternation; and the Templars, leaving their suppers, ran out of the hall with their knives in their hands. Part of the Temple Church was cast down, and some stones fell from St. Paul's, and two apprentices were killed at Christ Church. On the 8th of September, 1692, the merchants were driven from 'Change, and the streets filled with a panic-stricken crowd of swooning or wondering people. In 1750 there were so many shocks that White's was kept busy betting on the events, Grub-street publishing pamphlets regarding them, and quacks selling pills "good against the earthquake." Five years later the Lisbon earthquake agitated the waters of the fish-pond at Peerless Pool, in the City-road, and as late as 1852, 1859, 1860, 1863, 1868, and 1871, various local shocks have been recorded; while only last year a slight tremour was felt in the southern counties. Indeed, there is an area within sixty miles of Comrie, in Perthshire, which, as the seismometer in the tower of the parish church and the numerous reports in the annals of the British Association amply demonstrate, is rarely at peace, though the shocks are so faint that they require the aid of delicate instruments for their detection.

The connexion which might exist between earthquakes and the sun and moon was worked out by Mr. Perry, and his results examined by a commission appointed for the purpose by the French Academy of Sciences.

It was supposed by Mr. Perry that the sun and moon executed an attractive force upon the crust of the earth, just as it does upon the waters of the ocean, and cause it to swell until, meeting with resistance, the formation of fractures resulted, and hence the production of earthquakes.

By different analyses, and comparing them with the motions of the moon amongst other results which were arrived at, he came to the conclusion that earthquakes were more numerous when the moon was in perigee than when in apogee. Is it likely that the attractive power of the moon is so great that it could draw up the crust of the earth beyond its elastic limits? We know what it can do with water; it can lift up a hemispherical shell 12,000 miles in length, about 2 ft. or 3 ft. higher at its crown than it lifts the earth, even supposing the solid crust to be lifted one hundred times the apparent rise of the tide. Is it likely that a hemispherical arch 12,000 miles long, when it is raised 200 ft. at its crown, could by any possibility suffer fracture?

If an arch is 12,000 miles in length all that we here ask is, whether the materials which compose the arch are sufficiently elastic to allow themselves to be so far stretched that the crown may be raised 200 ft.

The result which we should arrive at is apparently so obvious that actual calculation seems hardly necessary.

Mr. W. S. Chaplin since then has conclusively shown that the earthquakes taking place in Japan, to the extent of over 1,000 years, are in utter discordance with this theory.

Foremost among all workers in the study of Seismic Science, we have had Mr. Robert Mallett, C.E., and Mr. Perry of Dijon; the labour of the former of these workers has been carefully examined and criticised by the British Association, and the latter by the French Academy of Sciences.

Up to comparatively recent times we have had, in an elaborate and exhaustive series of reports prepared by Mr. Robert Mallet for the British Association, an epitome and masterly co-ordination of all the facts which have been accumulated and the results obtained in the department of seismic science since very early times; with the results of these reports, which are founded upon varied analyses of over seven thousand recorded earthquakes, no doubt most of us are familiar; the results, we find, do not bring us to the threshold of positive knowledge, and they are chiefly negative in their nature, and the main reward of toil, so far, is the having cleared away the rubbish and shown us the road in seismic science above which the sign "no thoroughfare" is written.

The following letter from Mr. J. S. Green, Yokohama, was read at the meeting:—

"Sir,—To confirm my present observations, which have given me two curves of approximately true earthquake motion, and to be able to state definitely what these actual motions are, I am now anxiously waiting for about three more good shakes. One feels as anxious as a fisherman who is waiting for his float to bob. Earthquakes are no doubt very alarming, and when they shake down chimneys they are likely to be regarded as dangerous and unpleasant visitors. If, however, you could only persuade all your friends to go in for seismographs, I think they would derive from them a pleasure never anticipated. Those who lost their chimneys would, when they reflected upon the advantages which accrue to science when the nature of the movement that caused the fall of the chimneys has been studied, wish they had twenty more chimneys in readiness for an immediate repetition of the shock. Besides endeavouring to obtain the true motion of any earth particle, I have for special reasons been endeavouring to obtain records of the smaller shakings. By the use of a special form of microphone, when it is properly placed, it is not difficult to detect any movement, however slight, of the earth's crust. My microphones are buried in pits round about the house. Precautions have been taken to keep out insects, otherwise the tramping of a beetle would register as an earthquake. The pits must also be dug at a distance from a roadway or path, otherwise every step of persons passing, even if six yards distant, will be indicated by the recorder.

If several microphones were placed round about a house, not only would they be useful as seismographs, but they would indicate the creeping of an approaching thief; and lying in bed with a telephone to your ear you might count the number of steps as he approached towards your bedroom window. This hesitation would be indicated in the pauses between the steps, and you might thus have a basis upon which to speculate as to the temperature of your visitor.

Excluding beetles, thieves, and unexpected visitors, it would seem that for some time before the occurrence of a "shock" the telephone gives signs that the earth is crackling as if under an increasing strain; these indications continue for uncertain periods, but they have been distinctly noticeable before the last few earthquakes. It would seem that the power of resistance of the earth before any surface movement is felt is very great; but at last, like a bending stick, it suddenly breaks, and the jar gives the vibrations what we call an earthquake. If

these "crackles" can be detected we shall then have the means of approximately foretelling when the consequent crash is at hand. This, I think, has already been roughly indicated; but before making positive statements on this subject my present observations must be verified by repetitions.

J. S. GREEN."

This letter was read showing the application of microphones and telephones to the discovery of earthquakes.

SCULPTURE AT THE ROYAL ACADEMY.

I.—"GODIVA": BY C. B. BIRCH, A.R.A.

WE propose giving some illustrations of the leading works of sculpture in the Royal Academy, sculpture being the art which, among the plastic arts, is most nearly allied to architecture and most often employed in close connexion with it; and we are further moved to this by a feeling that sculpture, in the Academy exhibitions, receives far less attention than from its importance, as perhaps the most intellectual of all the arts, it merits. If any further reason be required, we believe that not a few of our readers and subscribers will be very glad to have these illustrations.

We commence accordingly with the group which we think most people will admit to be the prominent and leading sculptural work of the year, Mr. Birch's "Godiva," on which the artist may be congratulated on having achieved a really fine and expressive treatment of a subject which has been, unhappily, terribly vulgarised by artists of all denominations. The heroic sacrifice of the lady in the old Coventry legend (the historical accuracy of which, by the way, one of her descendants has called in question recently) has been the excuse for every dauber who wanted a title for a "nude study"; and even artists of higher calibre have treated it as a mere opportunity for the display of figure drawing. Mr. Birch has risen to a higher conception of the subject. His "Godiva" is no mere nude nymph, but a woman of high feeling and queenly dignity. The head, rather large in proportion to the body, emphasises this character, and the expression of the face, from whatever point of view we take it, is exceedingly fine and pathetic. A beautiful touch of expression is given by the attitude of the right hand laid on the horse's neck, not prone, but with the palm turned upwards, as if in supplication or appeal. The horse is very finely modelled, and the two group well together; the unity of the composition being assisted by the broad mass of the drapery serving to unite the vertical and horizontal lines of the figure and the horse.

The interest of our illustration will not be lessened by the fact that it is a facsimile of Mr. Birch's own drawing, kindly made expressly for our pages.

OLD LONDON BRIDGE AND ITS APPROACHES.

No building in England seems formerly to have impressed foreign visitors to this island with such astonishment as did "Old London Bridge." Wonderful as it was in reality, the description of it, written by a Roman ecclesiastic, who saw it in the sixteenth century, almost equals the marvels related in the voyages of Sir John Mandeville, and we need scarcely say greatly exaggerates its grandeur. Amongst other things he describes the bridge as being a mile long, 100 ft. high, and crowned with palaces and churches. Although, of course, this is an exaggeration, yet it serves to show what a very remarkable impression this edifice must have left upon the mind of the writer, who, be it remembered, had seen the architectural glories of Italy and those of the "Eternal City." It is fortunately possible for us to recall the appearance of the ancient bridge during almost every period of its existence; the great difficulty, however, in making a restoration of it, is to avoid anachronisms, and to be certain that the various buildings shown were all in existence at the same epoch, for the changes and alterations were very frequent, owing in a great measure to the numerous vicissitudes which befell this structure, especially from fire and tempest. The first stone of "Old London Bridge" was laid in the year 1176, and it was completed in 1206. The architect was a parish priest, who is known as Peter of Colechurch. Whatever defects there may have been in the way of construction, however much the architects and engineers of the last century, and even of the present day, may have sneered at his primitive ideas of engineering science, yet Peter of Colechurch did what probably no man ever did before or since his time,—that is, he built a bridge of stone, nearly a thousand feet long, over a great tidal river, which lasted nearly seven centuries. The bridges erected by his eighteenth-century critics in London have all disappeared, and, if we may judge from the experiences of the past few years, there is little to lead us to suppose that any of the bridges erected in our day are likely to last for even one-third of the time. Although in later times the bridge was covered with houses, yet, as originally erected, the only buildings upon it were two gateways, one at either end, and the double chapel erected upon the eastern portion of the centre sterling. Probably no other buildings of any kind were erected until the close of the fifteenth century. From this time, however, the bridge came by degrees to assume the appearance of a street with breaks at intervals. At the middle of the sixteenth century these intervals between the houses were reduced to three. During the fourteenth century a tower with a gateway beneath it stood upon the seventh pier from the Surrey side, and upon this tower the heads of traitors who had been executed for high treason were exposed. In 1577 this tower was taken down, and the heads and limbs of the traitors were removed to the gate at the Southwark end of the bridge. This Southwark gate appears to have been either partly or entirely rebuilt at that period, and the magnificent structure called "Nonesuch House" was erected on the site of the ancient tower. What was the precise object for which "Nonesuch House" was erected, whether it was a Royal palace or was intended as a residence for the Lord Mayor we are unable to say. It is stated by some writers to have been composed of timber, wrought and carved in the Low Countries, and floated piecemeal up the Thames. To judge from the representations of it, it must have borne a strong resemblance to the timber houses in Hildesheim and other towns in the north of Germany. Between the Southwark gate and Nonesuch House stood another very remarkable house, which was adorned with semicircular bow windows and crowned by a battlement. That this building was of considerable importance may be gathered from the fact that its foundation-stone was laid by the Lord Mayor in state, in the year 1577. Probably this building served the same purpose as the present Bridge House.

The pier upon which Nonesuch House stood was connected with the next pier to the south, not by an arch, but by a drawbridge, and this drawbridge has given rise to much controversy; for, as London Bridge had nineteen piers, some people maintain that it should be described as possessing twenty arches, but others more correctly maintain that a drawbridge could not be reckoned as an arch, and that, therefore, it could only be described as possessing nineteen arches; and this is the view taken in a singular old poem by John Leland, entitled "Kykneion Asma," or the "Song of the Swan," a translation of which is given in the Chronicles of London Bridge, 1827. The passage we refer to is as follows:—

> "The streaming river bears us on
> To London's mighty Babylon:
> And that vast bridge, which proudly soars,
> Where Thames through *nineteen arches* roars,
> And many a lofty dome on high
> It raises towering to the sky."

The greatest defect of Old London Bridge was the immense obstruction to the water-way, caused by the piers and projecting sterlings. Some idea of this may be gained from the fact, that although the bridge was 926 ft. long at low tide, when the water did not cover the sterlings the "water-way" was reduced to 194 ft., and an inquiry into the dangers attending the navigation of the old bridge shortly before its destruction reveals the fact that, although the water at low tide was 10 ft. deep, under the central arch it was sometimes only 18 in. deep a few yards "below bridge." The fall of water at the ebb of the tide was often as much as 8 ft., and at "full flow" must have been equally great in the opposite direction, so that the river could only have been navigable for large barges within about an hour or so of high tide. The Thames watermen became very expert at what was called "shooting the bridge"; that is, taking a boat down the cataract without either upsetting it or going under water. The term "shooting the bridge" has remained in common use, although it does not now convey the idea of danger, which it formerly did. Our view represents the bridge at "slack water." The existing ancient views of London Bridge are very numerous; those in the Crace collection have been carefully described in the *Builder* of April 12th, 1879, page 390. The earliest is an illumination dated 1419. The most important alteration which London Bridge underwent was in 1759, when the great centre pier was removed and replaced by an arch, and the houses on the bridge were removed. Attached to the approaches of London Bridge were several buildings of considerable interest. At the London end stood the Church of St. Magnus, which was destroyed by the Great Fire in 1666, and was subsequently rebuilt by Wren, and on the opposite side of the road were erected the first London waterworks; they seem to have possessed a lofty and picturesque tower, and to have dated from about the year 1588. At the Southwark end were the corn-mills, the Priory and Church of St. Mary Overy, and Winchester Palace. The Church of St. Mary Overy, now called St. Saviour's, is still a remarkably beautiful building, though it suffered terribly from the neglect of the seventeenth and eighteenth centuries, and still more from a disastrous "restoration" commenced in the year 1830. In speaking of this most mischievous work, we do not wish it to be understood that we intend to throw any blame upon the first architect employed,—the late George Gwilt. If his advice had only been followed, we should not have now to lament the destruction of the nave, the bishop's chapel, and the chapel of St. Mary Magdalene; and it is entirely owing to him that the destruction was not even more complete, for the architectural "authorities" of those days had even condemned the beautiful Lady-chapel and altar-screen. The portions of the church restored by Gwilt are well preserved, though his own work, as might be expected from the age in which it was done, is feeble and wanting in spirit. But of some of the works executed by other architects employed to *complete the restoration!* it would be impossible to speak too severely. The magnificent old nave, with its exquisite porches and interesting wooden vaulting, was simply pulled down to the ground and rebuilt in what was called "*the neat Gothic taste!*" The exterior of the transepts, though less objectionable, bears no kind of resemblance to ancient work of any period or style. The bishop's chapel, which was so ruthlessly destroyed, projected from the east end of the Lady-chapel, and was erected during the fourteenth century; it appears to have received its name from having been the burial-place of Launcelot Andrews, bishop of Winchester. The chapel, or church, of St. Mary Magdalene joined the south aisle of the choir, and consisted of a nave and two aisles; it was good, though very plain, Perpendicular work, and was the only portion of the church which was not vaulted; it must have added enormously to the picturesqueness of the building, and its useless destruction must for ever be a matter of regret. Within its walls were interred, in Henry the Eighth's days, the mortal remains of William of Wykeham (the second), Bishop of Winchester. The remains of the old priory gate, and a large crypt running north and south, probably forming the lower story of the dormitory building, existed some forty years back, but the monastic refectory was destroyed more than a century ago. It is said to have possessed a roof very similar to that of Westminster Hall, and had a louvre in the centre, and a large window at the east end, in addition to those at the side, which of course proves that it was parallel to the church. Separated from the priory of St. Mary Overy by a small creek, called St. Saviour's Dock, was Winchester House. It possessed a noble hall, portions of which were in existence as late as the year 1850. The walls were of immense thickness; hardly a vestige of this building, however, now exists. A small portion of it was recently discovered and duly measured and drawn, in the course of some building alterations, and this we shall shortly illustrate. Attached to Winchester House were a chapel and cloister; and it also possessed a large well-wooded park.

Edinburgh Architectural Association.—Owing to the absence in Germany of Dr. Ferguson, his lecture on "Electric House Fittings" is postponed until further notice.

THE HALL OF WINCHESTER HOUSE.

Wyman & Sons, Photo-Litho. C^o Queen S^t London, W.C.

WINCHESTER HOUSE.

LON

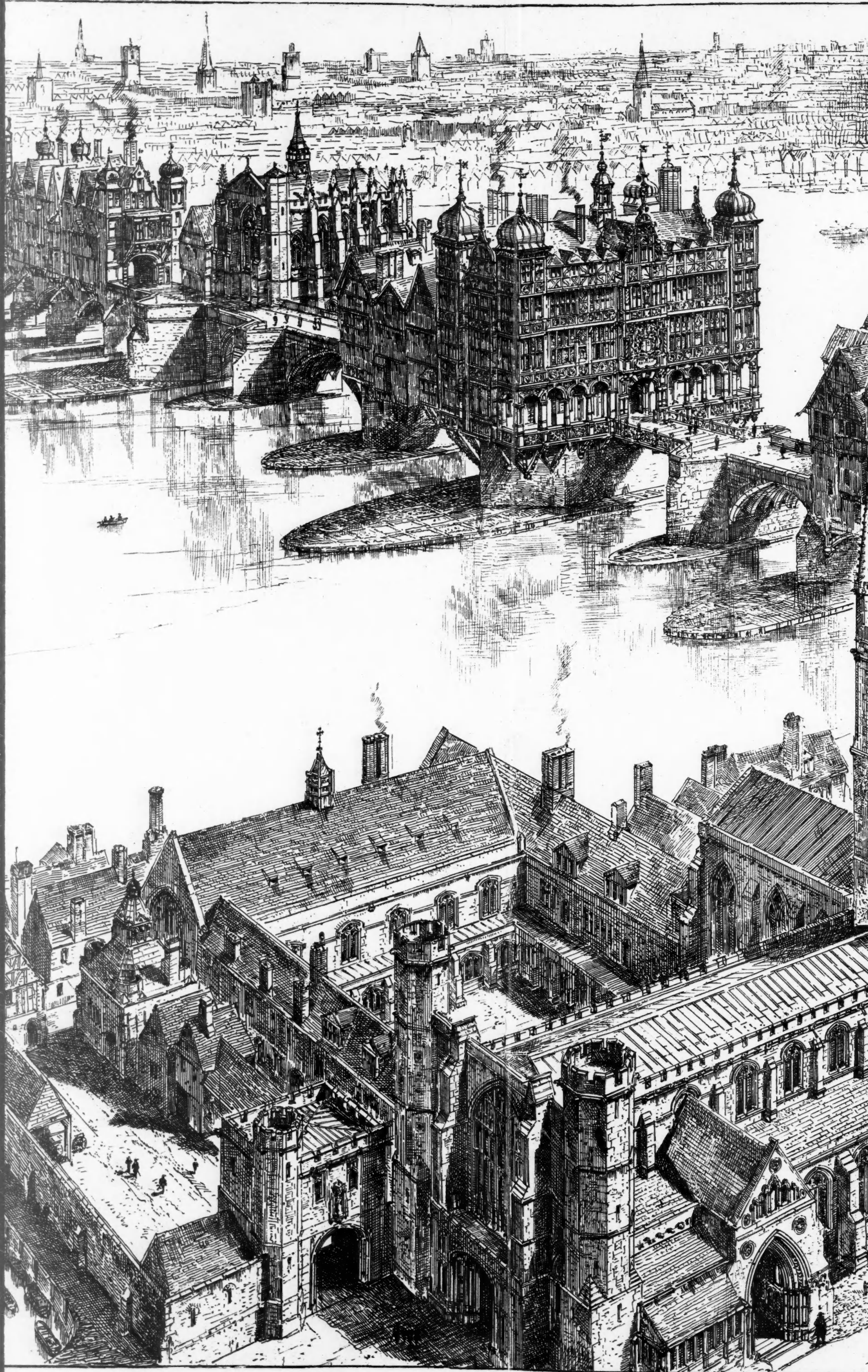
IN 1632. ST. THOMAS A-BECKETT'S CHAPEL. "NONESUCH HOUS

ST. SAVIOUR'S DOCK. THE PRIORY GATE. THE REFECTORY. ST. MARY OVE

ONDON BRIDGE AND ITS SURROUNDINGS

[FROM THE SURREY SIDE.]

ST. THOMAS A-BECKETT'S CHAPEL. "NONESUCH HOUSE." THE "DRAW-LOCK."



VIOUR'S DOCK. THE PRIORY GATE. THE REFECTORY. ST. MARY OVERIES CHURCH AND PRIORY (NOW ST. SAVIOUR'S).

ON BRIDGE AND ITS SURROUNDINGS ABOUT THE YEA

[FROM THE SURREY SIDE.]

"WOODEN TOWER" ON THE BRIDGE.

BRIDGE GATE, WITH HEADS OF TRAITORS.

THE PILLORY.

SOUTHWARK FLOUR MILLS.

THE BISHOP'S CHAPEL.

THE LADY CHAPEL.

ST. MARY MAGDALEN'S CHURCH.

EAR 1600.

C. F. Kell Photo-Lith & Printer 8 Castle St Holborn London

SCULPTURE AT THE ROYAL ACADEMY.

No. 1. Lady Godiva: Mr. C. B. Birch, A.R.A. Sculptor.

From an Original Sketch by the Artist.

C.F. Kell Photo-Lith. & Printer.

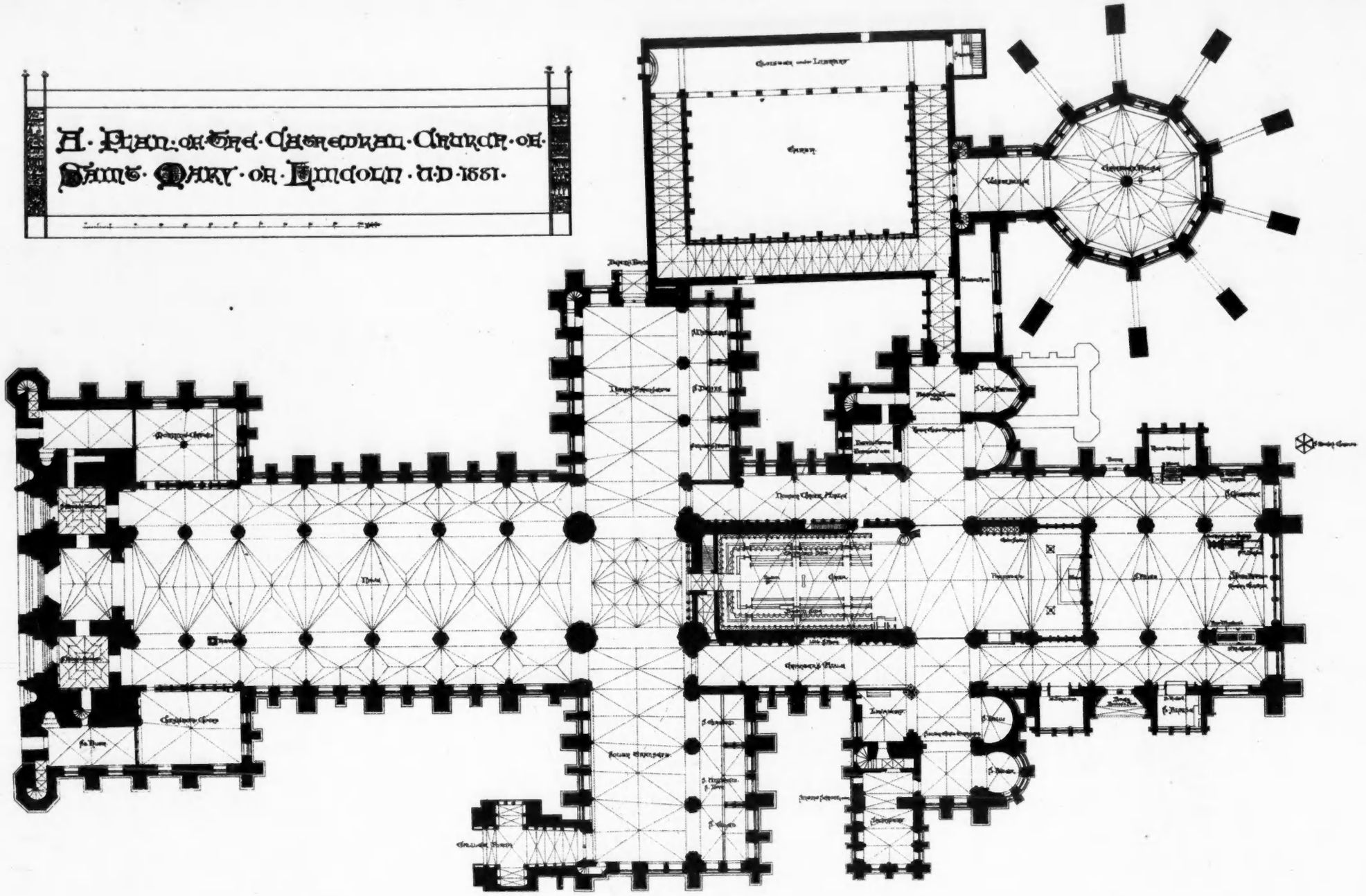
A.Beresford Pite, del.

8. Castle St. Holborn. London. E.C.

NEW WAREHOUSES, WOOD STREET, E.C.

MESSRS. J. AND J. BELCHER, F.R.I.B.A.
Architects.

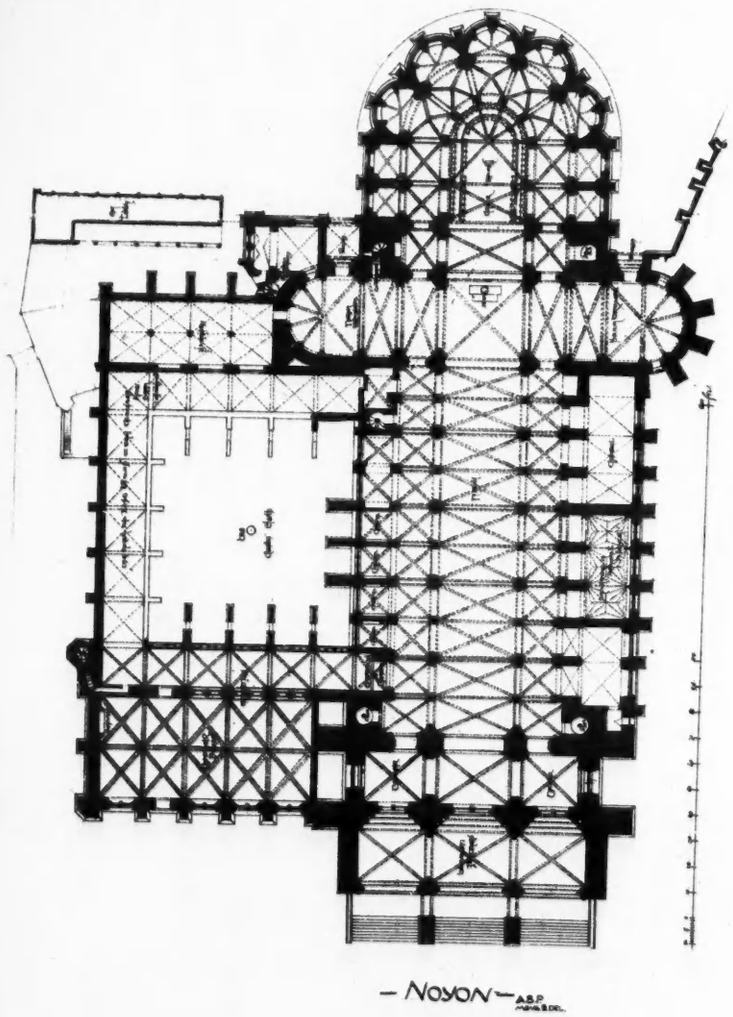
A Plan of the Cathedral Church of Saint Mary of Lincoln A.D. 1881.



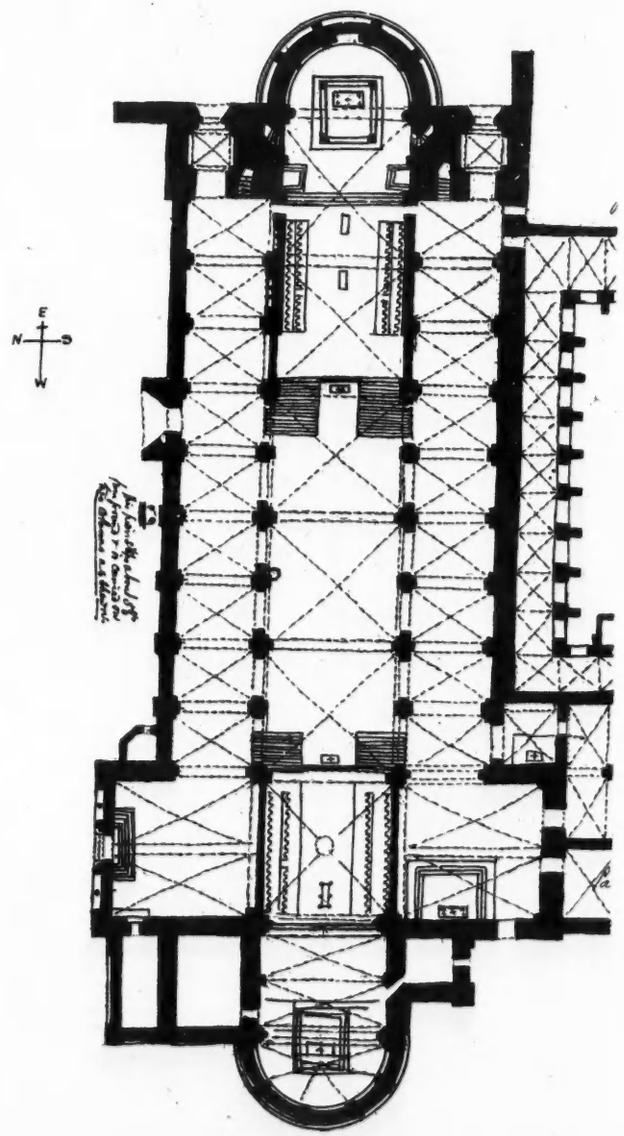
CATHEDRAL PLANS
ILLUSTRATING PAPER READ AT THE ARCHITECTURAL ASSOCIATION,
BY MR. A. BERESFORD PITE.

BY MR. A. BERESFORD PITE.

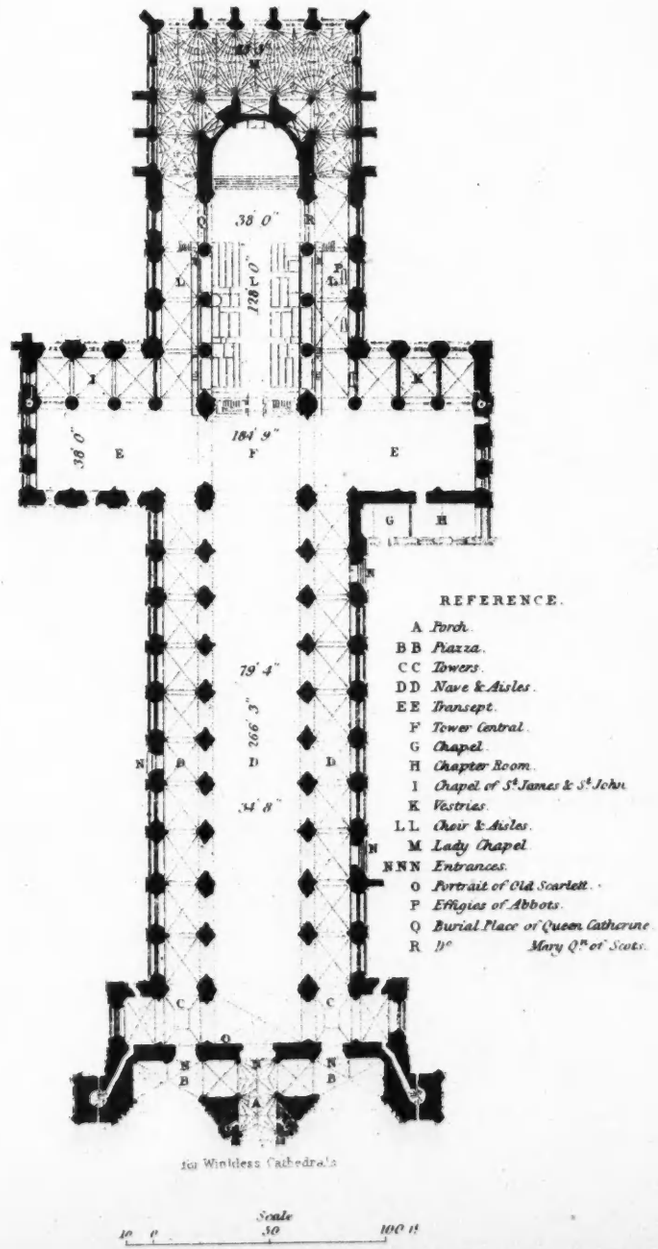
PETERBOROUGH CATHEDRAL.



— NOYON — A.B.P. MENS. & DEL.



BAMBERG—H. W. K. MARTIN, MENS. & DEL.



for Wingless Cathedrals

Scale 50 100 ft

C F Kell Photo-Lith & Printer.

8. Castle St Holborn. London. E.C.

MESSRS. RYLANDS & SONS' NEW PREMISES, WOOD-STREET.

THE illustration furnishes a view of a portion of the premises being erected by Messrs. John and John Belcher, for Messrs. Rylands & Sons, Limited, in Wood-street. These buildings have also extensive frontages in Philip-lane and London-wall, which have been in course of erection since the great fire at Christmas, 1882.

Owing to light and air complications, the height of the premises in Wood-street is arranged at different levels. Advantage has been taken of this to form a central feature, and artistic grouping by the introduction of a turret and projecting clock, which break up the sky-line and mark the position of the principal entrance. The fronts are being executed in red Mansfield stone, and the whole of the work carried out by Mr. F. W. E. Braid, of 6, Beaufort-street, Chelsea, and the carving by Mr. T. W. Seale, of 42, Thurlow-street, East-street, Walworth.

THE ARCHITECTURAL CONFERENCE.

(Continued from our Supplement.)

STREET, BURGES, AND VIOLLET-LE-DUC.

IN the discussion which followed the reading of the three papers by Mr. Beresford Hope, Mr. Aitchison, and Mr. Wethered,

The President (Mr. Christian) remarked that all those present would heartily join in passing a vote of thanks to Mr. Beresford Hope for his great kindness in drawing up the paper. It was quite exhaustive of the subject. By the death of Mr. Street they had sustained a loss which they could not all fail to lament. The only exception he could take to the paper was that in it Mr. Street was credited with the restoration of Carlisle Cathedral, which he (the Chairman) carried out. The only work which Mr. Street did in regard to the restoration was the erection of a reredos, and also the Fratry. He had no observations to make in regard to the other parts of the paper, but he was very glad to find that Mr. Beresford Hope stood up so stoutly for Mr. Street with respect to the Law Courts, of which so much had been wrongly said.

Mr. Aitchison observed that he could not allow so eloquent a paper as that which had just been read to pass without saying a few words. Had he had an opportunity of analysing the paper beforehand he would have been prepared with something more to the purpose, but he would endeavour to state the sentiments which had been evoked by the very brilliant tribute which had been just paid to the great Frenchman. No one could feel more than he did that M. Viollet-le-Duc was one of the most extraordinary men of his generation. He appeared to have combined a rare talent as an architect with that science and constructive instinct which were to be found in very few persons. A countryman of his was present, M. Chas. Lucas, who, he hoped, would say a few words on that occasion.

M. Charles Lucas, addressing the meeting, said:—"Monsieur le Président, Messieurs,—Je demande la permission d'exprimer tout l'intérêt que j'ai pris à entendre les trois éloges qui viennent d'être prononcés, et je désire rappeler brièvement les souvenirs qu'ils ont reveillis en moi. M. Street, était bien connu en France, ne serait ce que par l'Église américaine de Paris et le beau projet qu'il envoya au Concours de l'Église Notre-Dame de la Treille, à Lille, et je me rapelle la visite qu'il me fit faire en 1878, de sa grande œuvre alors en cours d'exécution, vos New Courts of Law. Quant à Burges, j'assistai, à ce même voyage de 1878, à la fête toute intime qu'il donna à quelques amis pour l'inauguration de son habitation, et là, à même ses cartons d'études, dans cette demeure si personnelle, j'ai pu apprécier toute sa verve de dessinateur, toute son originalité d'artiste. Mais, Français, je veux surtout vous remercier du grand honneur qui vient d'être rendu, dans cet Institut Royal des Architectes britannique, à un maître français, à Viollet-le-Duc, un maître très-discuté, même en France, mais qui a laissé deux livres impérissables: "Le Dictionnaire de l'Architecture," et de le "Dictionnaire des Arts du Moyen-Age."

Professor Kerr said it seemed to him that the three papers which had been read, taken as a group, were calculated to elevate and improve their minds more than any contributions that he had ever before heard presented to that Institute. Differences of opinion sank into insignificance before such an eulogium as had been delivered in either case by the eloquent speakers and writers who had taken for their subjects their distinguished friends Street and Burges, and their equally—he did not say more—distinguished friend, Viollet-le-Duc. He felt that they were mostly men of business whom he saw surrounding him, but when they came to that room on such an occasion as the present they were shut out of the vulgar and sordid world. He had listened with particular pleasure to the eloquent and dignified periods of Mr. Beresford Hope, whose language, when he chose to make it so, was always especially pleasing, especially practical, and especially suitable to the subject under discussion. They had also listened to their dear friend Mr. Aitchison, who was always so exceedingly pleasant in every way. While Mr. Beresford Hope exalted the character of their dear friend, Mr. Street,—for they might use that term in regard to him,—Mr. Aitchison spoke to them in his felicitous way of his friend and their most amusing companion, Burges, who had left them, and they found in Mr. Wethered an enthusiasm which raised them up to the grandest thoughts, and it seemed almost a profanation to ask any one to do more than to say, as he did, that the subject of the papers was beyond their discussion. He was proud of the Institute, and he hoped they would benefit by what they had heard that night.

Professor Kerr then announced that the Lord Provost of Aberdeen was present, and expressed a hope that he would address a few words to the assembly.

The Lord Provost of Aberdeen (Mr. James Matthews, architect), said he could assure them that if he had believed his name would have been so prominently brought forward, he should have thought several times before he had ventured to put in an appearance on that occasion. He would say, however, that he had experienced a treat which did not often fall to his lot, situated as he was in one of the Northern towns of the Kingdom. It was not often that he could be present at those meetings, or he would be a regular attendant. He looked back with pleasure to the few years that he spent in London in his youth, and he might say he was proud of having been in the two offices in which he spent the greater portion of his time in London. He was in the office of their esteemed friend, Mr. Donaldson, and it was with a feeling of great pride that he referred to the fact that when he came to London as a poor clerk, Professor Donaldson took him into his office. He looked back with much pleasure to that time. He had seen him in Scotland since, and Professor Donaldson had not forgotten the poor young man whom he had assisted and befriended. The next office he was in was that of Sir George Gilbert Scott, and he was several years with him, sitting next to Mr. Street. He spent those years there not only with pleasure but with profit. He had been long removed from this centre of everything that was great, but he had often felt, though he had no reason to complain of any want of success in the northern town where he resided, that it would have been a satisfaction to him to have spent his days in London. He felt it a high honour to be raised to his present position in so important a town as Aberdeen, with its 110,000 inhabitants, and he felt that this honour reflected on the profession. He believed he should be able to exert some influence in obtaining an important Improvement Bill for Aberdeen, and he sincerely hoped that he should be able to do something for the town which would leave its mark, during his three years of office.

Mr. R. Phené Spiers, F.S.A., observed that he should have occasion in the paper which he was to read on Friday, to say a few words with respect to Mr. Street, and he, therefore, would not further refer to him on the present occasion. Of Mr. Burges he had an intimate knowledge, and he had enjoyed the immense advantage of his teaching. Long before he was an Associate he had frequent conversations with him as to the course he should adopt. From a close and intimate acquaintance he was one of the few who had influence with Mr. Burges. The numerous works published by him would exercise greater influence than perhaps those of any other architect of the present day or century. He also knew M. Viollet-le Duc, and had the pleasure of staying with him a few days at his château. M. Viollet-le-Duc had one sorrow in that he was not able to influence French architecture so much as he could have liked. The traditions of the Academy were too powerful for him, but he had a great number of subscribers among the French students, although they did not see their way to reproduce his ideas. Mr. Spiers concluded by moving a vote of thanks to Mr. Beresford Hope, Mr. Aitchison, and Mr. Wethered, for their papers.

Mr. J. P. Seddon begged to second the resolution, and he did so with hearty zeal. They had had a great treat that evening. The three men of whom they had heard so much were men of rare qualities, which placed them among the most distinguished men of the age. The subjects had been treated in a most admirable manner by the respective writers. They had had the dignified characteristics of Mr. Beresford Hope, the charming manner of Mr. Aitchison, and the great enthusiasm of Mr. Wethered. It was a great satisfaction to him to be able to say that he, like Mr. Spiers, had known all three men. With regard to Mr. Burges, he was his intimate companion; he loved the man exceedingly, his fun was unbounded, and one point which was very noticeable was his great generosity to the other members of the profession. He was always ready to give those who asked for it the benefit of his knowledge of mediæval architecture. The style which those three men had learned and taught was not fashionable now; they were drifting to another style; but it was not by forgetting the glorious structure of the Middle Ages that a new art was to be formed.

The Chairman, in closing the discussion, said he was sure they had had a most charming evening, and also a most profitable one. He quite agreed with what had been said on the subject by Professor Kerr. It had been one of the most enjoyable meetings he had been present at for a very long time. They had had the reviews of the careers of three of the most powerful workmen of this century. Street, as they all know, was a giant in his day; Burges was hardly less an one, for he was one of the most thorough men of his day; and, as for Violet-de-Duc, there was hardly anything he did not make himself acquainted with in architecture. He was master of almost all that science and art could teach him. These papers had been so excellently done, and there had been so much enthusiasm shown in them, as to be thoroughly refreshing, and he was sure they would, by acclamation, give their most hearty thanks to the composer of each of them.

Professor Kerr said there was one formality which had been forgotten on Monday evening, and which he would endeavour to supply by moving the following resolution:—

"That this meeting desires to offer to Professor Donaldson their congratulations to himself personally on the interesting occasion of the fiftieth anniversary of the foundation of the Royal Institute of British Architects, in which he took so important a part."

They all knew how kind and friendly Professor Donaldson had been to all who had ever come in contact with him. On one occasion, when about to start for Italy, he went to him for a letter of introduction. He found his manner quite charming, and the letter he gave him proved of the utmost importance to him.

The Chairman put the resolution, which was carried by acclamation.

VISIT TO GUILDHALL.

ON Tuesday morning the members and visitors assembled in the old Council Chamber, Guildhall, at 10.45 a.m., where they were received by Mr. Horace Jones, the City Architect. Here was displayed a large coloured interior perspective drawing of the new Council Chamber, and other drawings. Mr. Horace Jones conducted the members to the new Council Chamber, which he described. He said it was a twelve-sided chamber, planned on the principle of the ancient chapter houses, for acoustic reasons. A circular chamber would prove too much of a speaking or whispering gallery, that would destroy the effect intended, viz., that of enabling every speaker to be distinctly heard. He next gave some general descriptions and details, which were practically the same as those given in the *Builder* of a few months ago,

when we published a double-page view of the interior (December 1st, 1883).

We may, however, recapitulate to some extent. The dimensions of the building, as shown by the drawings, are as follow, viz.:—

	ft.	in.
External diameter	78	0
Internal diameter (within screen)	54	0
Corridor in clear	9	0
Internal height from floor to dome	61	6
Ditto to top of lantern	81	6
External height to vane	100	0

The entrance for the Lord Mayor will be from the dais at the eastern end of the Guildhall, and his chair will be placed at the east side of the chamber, and on his right and left will be seats intended for the twenty-five Aldermen and also for the two Sheriffs, the Recorder's chair being immediately at the Lord Mayor's right hand. Sitting accommodation for all the commoners (206 in number) is provided, the seats being ranged concentrically on a rising stage, giving each member his own definite seat, as is now the case with the Aldermen in the Court Room. The arrangement for taking divisions will be for the "Ayes" to go out at the door on the Lord Mayor's right, and the "Noes" at the door to his left, the numbers being taken by the tellers situated at the two turnstiles, the members returning to their respective seats by the western doorway, and passing the bar of the Court. Immediately in front of the Lord Mayor (and at a lower level than his chair) will be placed the table for the officers. In the centre of the chamber will be a table for the exhibition of plans, papers, models, &c., and immediately opposite to the Lord Mayor will be the City Seal and the bar as at present, with considerable additional space for petitioners. The entrances for the Lord Mayor and Aldermen, for the members of the Common Council, and for the public, will be all distinct. The members will enter at the west side from the corridor which now leads to the present Council Chamber. The accommodation for the public will be provided in the gallery; they will have access to this gallery by stairs perfectly distinct from the members' entrance. Though doorways are provided, these would not be opened unless under special necessity. The corridor surrounding the Council Chamber will afford convenient space for members to converse with one another without disturbing the business of the Court, from which it is divided by a glazed screen. Accommodation for the Press will be provided in the gallery over the Lord Mayor's chair. The floor under the Council Chamber will afford good office accommodation, and in the centre of this lower floor will be the access by a staircase to strong rooms situated in the basement. The elevation of the exterior of the building is of a style to harmonise with the Guildhall and Library.

The corridor which surrounds the chamber will, it is believed, afford a ready means of control over the temperature and ventilation of the Council Chamber itself, for if the temperature of this corridor is maintained at from 59 to 61 degrees, no great difference should be felt between that temperature and the temperature of the Council Chamber itself (especially as the use of gas will probably be eventually avoided), thus affording a means of introduction for fresh warm air into the chamber without appreciation of unpleasant draughts. The dome being of two thicknesses will prevent the solar heat affecting the temperature of the Council Chamber, whilst at the same time affording a ready means for the extraction of vitiated atmosphere, and for which, as well as for the introduction of fresh air (warm or cold), mechanical means are provided. Ventilation is also provided round the sides of the lantern. Mr. B. E. Nightingale is the builder.

The statue of George III. (said to be Chantrey's first statue), at present in the old Council Chamber, would, Mr. Jones said, be removed to the new Council Chamber, as shewn in the illustration referred to. The members next adjourned to and inspected the library, reading-room, museum, and committee-room, where they were introduced to the librarian, Mr. Overall, who described these portions of Guildhall, and said there were lying on the table some ancient books and manuscripts, and particularly, the original map of London, by Aggas, which objects of interest were minutely inspected by those present. The whole party then proceeded, under the conduct of Mr. Gruning and Mr. J. Douglass Mathews, to the new Stock Exchange, Old Broad-street.

VISIT TO THE NEW STOCK EXCHANGE (EAST ADDITION).

A LARGE number of visitors subsequently assembled in the new reading-room of the Stock Exchange, which occupies the greater portion of the ground-floor next Throgmorton-street. Here they were received by Mr. John J. Cole, the architect of the building, who explained the working drawings. The ground plan consists of large octagonal hall, which is 68 ft. span, and covered with a large circular dome of iron and glass 70 ft. diameter clear, and 52 ft. from floor to the springing, giving a total height of 110 ft. to top of cupola. Mr. Dawnay, C.E., of London Bridge-house, has constructed the ironwork to dome and transepts, and supplied the other constructional ironwork. Mr. Cole said the new Stock Exchange was rendered necessary through the old one proving inadequate.* The old Stock Exchange contained about 8,000 superficial feet, and the new one about the same quantity, so that when the two were added together, which it was intended to do by pulling down the east wall of the old Stock Exchange, the two would become one large hall of 16,000 superficial feet. The present contract is undertaken by Mr. George Shaw, builder, of Westminster; and the amount of the contract is £80,000, exclusive of granite to piers and portion of excavation. Mr. Richard William Payne is the clerk of the works, and Mr. Miller principal foreman to the contractor. The walls of the building throughout are constructed with best Gamlingay gault stock bricks in Portland cement. The piers and pendentives are built in blue Staffordshire bricks and Portland cement, and bonded with hoop-iron each course. The whole of the external walls, where not of stone, are faced with white glazed bricks. The external dressings are of Portland stone. The plinths, pilasters, angle quoins, and frieze to north front are of Shap granite from Messrs. Fenning's quarries. The whole of the internal granite has been supplied by Messrs. Fraser & Son, of Broadford Works, Aberdeen. The interior of the large hall, which attracted much attention from the visitors, is faced up to main cornice with polished Pavonezza marble, built in as part of the work in 2 in. and 4 in. thicknesses alternately. The pendentive are faced with Aubigny stone up to upper cornice. Besides the large hall, the ground-floor contains two transepts, 22 ft. wide each; two side aisles, 15 ft. wide each; two semicircular apses, vestibule, members' washing and reading rooms, post-office, and other offices, the whole being approached by the principal entrance from Throgmorton-street, and two other entrances from Old Broad-street. The principal entrance is lined with a deep granite plinth or dado, and polished Plymouth marble above dado to Portland stone cornice; the ceiling here is panelled in Portland stone resting on cast-iron ornamental girders. The walls of the vestibule and small lobby are lined with Ipplepen marble plinth, and Plymouth marble dado 4 ft. high, and from dado to ceiling with Sicilian marble. The ceiling is executed in Hitchins's patent plaster finished in Martin's cement. All the other ceilings throughout, where of plaster, are also finished in Martin's cement. The steps and landings in front entrance, and to principal staircase, are laid first solid Craigleith, then 1½ in. loose Craigleith treads for easily replacing when worn out. The staircase walls are lined with light Ipplepen marble dado, and Pavonezza marble above the same to cornice. The ornamental cast-iron balusters by Messrs. Cooper & Son, of 121, Drury-lane, are surmounted by a mahogany handrail.

The total area of the new Stock Exchange on ground floor is 15,000 superficial feet. We understand the east wall of the old Stock Exchange will shortly be taken down on the completion of the new hall to unite the two buildings. Besides the principal staircase there are other staircases leading to the settling-room and to the settlement departments, the former covering the area under the large hall, and the latter occupying the second and third floors of the north building. The principal staircase leads to the large committee-room, secretary's offices, manager's room, and other offices. The visitors having returned to the reading-room, unanimously passed a vote of thanks to Mr. J. J. Cole, who, in replying, expressed the hope that, when the new Stock Exchange was completed and the buildings united, they would all come again and see the effect. In Mr. Payne's, the clerk of the works, office was shown a quantity of pottery, which, together with coins and other Roman relics, were discovered on the site by Messrs. Brass, when excavating for portion of the foundations.

* For notes on the history of the Old Stock Exchange see Peter Cunningham's "Handbook of London."

VISIT TO THE UNDERGROUND RAILWAY.

THE visitors next proceeded to the works of the Inner Circle Completion Railway. The progress making with this remarkable piece of engineering from Mansion House Station to the Tower is very rapid, the tunnel having for some time been completed. The laying of the rails and the building of the stations are the remaining work to be done. These are advancing by noticeable strides even from day to day; and in a short time the trains will pass along the subterranean way. The history of how that way has been made will be very interesting to others than engineers. The whole distance runs under the busiest centre of the largest and busiest city in the world, and it is claimed that all the many operations of construction and excavation have proceeded without serious injury to any one or interruption of business or traffic. Portions of the line have passed through quicksands and former river beds; other portions under lofty warehouses and stately edifices; others under streets through which the movement of vehicles and pedestrians never ceases from morn to night. The whole of the shops and houses in Cannon-street have been underpinned and the concrete supports carried down 30 ft. on and into the tertiary clay. The old Wall-brook has been carried under the tunnel into the Low-Level Metropolitan Sewer: the former district sewer from Walbrook to King William-street has been divided and flows in two culverts, one on each side of the new railway, and the City sewer running towards London Bridge has also been rebuilt at the lower level required by the exigencies of the line. All the branches and house-connexions required have been duly made: gas mains and water mains have been held up by timbering for a time and then built up to and supported from below. And all these subterranean operations have proceeded for months upon months without cognisance by the thousands of inquisitive minds who have ceaselessly passed over the workers below. The general dimensions of the underground tunnel are 25 ft. 3 in. in width; 21 ft. 6 in. from centre of the concrete invert to the soffit of the arch; and 18 ft. is the distance between the centre of the covered way and the plane of the rails. The general system of execution, as, for instance, in Cannon-street, where the course of the line and the street corresponds, has been to cover over the road with planking; then to dig a trench on either hand and put in the side walls; next to build the arch over on wood framing resting on the undisturbed ground; afterwards to excavate the solid earth; and, finally, to construct the concrete invert with its longitudinal central drain. The same fundamental system, modified by circumstances, has been adopted for other requirements.

The most extraordinary proceeding in the whole of the undertaking has been the undermining of the colossal statue of King William IV. and the construction of the tunnel below without removal or disturbance. The weight to be dealt with was no less than 170 tons, and the statue now rests entirely upon the crown of the arch of the tunnel. The old foundations of the pedestal of the statue,—round in form,—stood right in the path of the railway, and were composed of lime-concrete filled in upon the ancient inequalities of the ballast ground. The east and the west sides of these foundations were cut away, and two rectangular legs of Portland concrete, 9 ft. by 4 ft. in section, were built in from beneath the stone pedestal down to the London clay at a depth of 40 ft. The support of the statue being thus transferred, a heading was driven through the top of the central portion of the old foundations and the crown portion of the tunnel-arch built through and upon the excavation. This being done, the upper parts of the legs were similarly excavated, and the corresponding crown portions of the arch turned over. The side walls being erected the lateral portions of the tunnel-arch were constructed and made good with the central portions. All obstructions to the course of the line were then cleared out of the way, the thick-

ness of the supporting crown of the arch being eleven rings of brickwork, or rather over 4 ft. in thickness. Another remarkable undertaking was the carrying of a skew arch under the lofty warehouses in St. Thomas Apostle. Here four concrete pillars were made to support the buildings, the side-walls of which were first cut out to admit the execution of the central section of the arch; lateral portion of the arch being subsequently built up to it. The traffic in the streets generally was, of course, kept from interference by the laying down at nights of sections of wood planking after the common practice of contractors. But there is nothing of the kind on record to compare with the magnitude of the undertaking, and the despatch used in the case of the fore court of the South-Eastern Railway and Hotel. The railway traffic could not be permitted to be barred, and the only interval available was that between the despatch of the Paris night express and the time of starting the early morning trains. Three hundred men and all the materials were got ready for the occasion; and, so soon as the Continental train had left on its journey, the workmen commenced simultaneously over the whole area. The stone paving was removed. Timber baulks were placed at the proper distances on the ground, and thick planking was laid and crossed over them; and, when the station doors were opened in the morning, the fore-court was paved with wood and the engineer's requirements accomplished. The upper world being thus shut out from the lower world the contractor went on his subterranean way in peace and isolation. Headings were driven under this paving-roofing, and struts were put in beneath the timbers. The burrowings in the earth went on and galleries were formed for the inter-communications of the workmen. Pits were sunk to the depth required for the pillars to support the future iron roof of the underground station; blocks of Bramley Fall stone were lowered down into place for these foundations; the iron pillars themselves followed. Iron girders were brought in, and these are being lifted into position by hydraulic jacks working still upon the top of the solid ground in the galleries beneath the wood paving of the forecourt. These girders as placed are being riveted up to the iron pillars and connected with the supports upon the side walls. So the underground station is being built underground, embedded in the solid earth. Visitors now wander amongst deep iron plates and iron pillars, some still embedded, others more or less exhumed; and as the earth is excavated more and more of the finished station becomes revealed. The general operations in the execution of the stations are similar in every case, and all are advancing well towards completion. That at Fish-street-hill is almost ready, Seething-lane is two-thirds advanced, and Cannon-street is half done. All the stations are of the same type, being entirely underground, about 350 ft. long, with rows of iron pillars parallel with the platforms supporting the roads, warehouses, and edifices above. In width they are from 50 ft. to 70 ft. The booking-offices will be light buildings, above ground, except in the case of Cannon-street, where there will be an ornamental staircase, leading direct into the subterranean station, which will be immediately below the front or street boundary of the courtyard, formerly occupied by a flight of steps and a row of pilasters. The tunnel and the stations form together a continuous covered way, the ventilation of which will be provided for on the same principle as in mines, by two powerful fans, to be worked by steam-engines. The one being under the house No. 8, Cannon-street, and the other in Little Tower-street. Lofty brick shafts in each instance will be erected, and will throw off the steam from the locomotives, and the contaminated air high above the tops of the adjoining houses. The engineers of the line are Sir John Hawkshaw and Mr. J. Wolfe Barry; the resident engineer is Mr. Seaton. The contractor is Mr. T. A. Walker, of Westminster, for whom the work is being conducted by Mr. Wardhaugh, whose extensive experience in the execution of former sections of the Metropolitan Inner Circle Railways has been of the greatest value. At the rate of progress which is making, there is good prospect of the opening of this great undertaking not being much, if at all, delayed beyond the month of July next, as originally contemplated.

VISIT TO THE ROYAL ARCHITECTURAL MUSEUM.

A VISIT was made to the Architectural Museum and School of Art, Tufton-street, Westminster, on Wednesday afternoon. The visitors were received at 2 p.m. by Mr. J. P. Seddon, who read a paper giving a general and chronological description of the principal objects of interest there, commencing with the beautiful marble reliefs from the ruins of one of the ancient capitals of India, situate in the desert of Rajpootana, circa 1100, presented to the Museum by Sir Bartle Frere. Mr. Seddon rapidly referred to the many objects exhibited, and pointed them out to the visitors. He drew special attention to the collection of Venetian and Veronese casts presented by Mr. Ruskin, and said "those who would read the 'Stones of Venice' should first come here and see the casts." Mr. Audsley proposed and Mr. Lacy W. Ridge seconded a hearty vote of thanks to Mr. Seddon, and also to Mr. Randall Druce, the curator, who subsequently read a paper on the progress of the School of Art in connexion with the Architectural Musem, and on schools of art in general.

WE have thus brought our report of the proceedings of the Conference down to Wednesday evening. Of the Visits made on Thursday and Friday, and of the papers and discussions at Friday's meetings, we will give a report in our next.

ART APPLIED TO COACHBUILDING.

THIS was the subject of an interesting paper read at the Westminster Town Hall, on the 30th ult., by Mr. Henry Julian, of Bolton, before the members of the Institute of British Carriage Manufacturers. We quote a few passages:—

A carriage is a highly complex production. From one point of view it is a piece of mechanism; from another, a work of art, and is good or bad, a success or a failure, as it possesses the characteristics of the latter: then it must follow that a coach-builder and an artist should have gifts and qualities of the same order and cultivate them by the same means; that is, he should have a hand made deft by practice, capable of doing the finest and most delicate work, and an eye educated for proportion, form, and colour. If this be so, and I think no one will doubt it who knows anything of the art, no coachbuilder can produce the highest results who has not made himself conversant, not only with the principles of construction, but also with those of art. No one denies that the first demands study and experience, but there are very many who think that they have an intuitive knowledge of what is fitting and beautiful, and therefore that it would be a waste of time on their part to study what has been done by the potter, the sculptor, and the artist, with the view of transferring the graceful lines and harmonious colours of vase, statue, or picture to their work, and yet to attain to efficiency in the one demands less time,—a lower standard of mind than the other. An artist or a sculptor is not the product of a day, he is eminent only in proportion to the time and thought he gives to his work, and what is necessary to him is necessary to us. A word or two will make this self-evident. The three essentials of a work of art, are proportion, form, and colour, and these are the essentials of a good carriage. A knowledge of them does not come by intuition. They are inseparable from experience, culture, and taste. The eye must be educated so that it shall detect at a glance when one part is too large for another, and when one part, not only is, but looks strong enough for the weight it has to bear. This seems very simple; but were it as simple as it looks, it would not be violated as often as it is. Sometimes we see a quarter panel out of all proportion too large for the door, and rockers unusually deep to admit of the upper panels being shallow, with a view of producing a light appearance, but in reality giving prominence to a part that should be concealed as much as possible. At other times, the neck of the boot so narrow as to awaken the feeling of insufficient strength in that part, and a seat so top-heavy that it looks as if it got there by mistake.

It is no uncommon thing to see beds and sway bars that strike you as being too heavy, and tongue pieces and nunters as too light to give any support to the wheel-plate, and blocks and felloe-pieces so deep that you are forced to conclude that the carriage-maker worked by the rule of thumb. Occasionally we see springs made of such narrow steel that the number of plates have to be doubled, thereby decreasing their elasticity and increasing their liability to overlap and break, and wheels of such slightness as to suggest extreme frailty and danger to the occupants of the carriage. No one will doubt that these are defects,—defects that detract considerably from the appearance of a carriage, and that would not be tolerated in the work of a man of sound judgment and good taste. If a carriage be not of good proportion, all the finish that may be lavished upon it afterwards cannot condone this defect. It is as offensive to the educated eye, as a badly-drawn figure in a picture, however brilliantly it may be painted. Unfortunately, proportion is not a thing that can be settled by compass and rule. It is purely a matter of experience and taste. If a man cannot see it for himself,—you cannot always show it to him by saying it lies here or there. Proportion is perfect balance of parts,—when the eye is satisfied, and you cannot detect the relationship that one part bears to another, then you have proportion,—proportion that is as true as it is beautiful.

Beauty of form, that is, graceful, flowing lines, or what we call "unbroken sweeps," are as essential to a carriage as they are to a vase or bust. Until lately there was a wide-spread idea in the trade that drawing was not an essential accomplishment for all. It was even assumed that a body-maker could do his work satisfactorily without it. No doubt he could do it soundly, and if supplied with a full-sized drawing of the side elevation, could make a body without any very noticeable defects; but a large number of masters cannot draw, and do not, or cannot, afford to keep a draughtsman, and to expect under such circumstances that men without a knowledge of drawing can produce what is either graceful or beautiful, is to expect an impossibility. The hand that cannot trace a beautiful curve cannot make one. You might as well expect the colour-blind to outrival a Turkish carpet or a Moorish scarf. A knowledge of drawing,—freehand and mechanical,—is indispensable, for without it truth, grace, and beauty are unattainable. No doubt all do not possess the necessary gifts; but many possess them unknowingly, and nothing but trial will prove who has them and who has not. We cannot afford to let this class of talent run waste. At best it is not an unlimited quantity, and we must conserve and develop what we have, if our products are to be as remarkable for beauty as they are for constructive skill.

Very few of our customers know anything of the construction of a carriage,—they are influenced by the general effect; that is, they are pleased with a carriage as it realises their conceptions of ease, grace, and harmony. Then it is important for us to discover how this end may be attained. Above all, I should say, by paying strict attention to form; that is, by taking special care in designing a carriage that one line shall spring naturally from the other, and that all the lines, when combined, shall be graceful and flowing; that no part shall have more than its due amount of prominence; and that all ornament shall be subordinated to fitness. Short, broken lines destroy the feeling of unity,—that the design was the outcome of one mind. Unnecessary structural members are contrary to the fundamental principle of art,—that nothing is beautiful that does not serve some useful purpose,—and unnecessary or over-elaborate ornamentation destroys the feeling of repose essential to harmony. In this respect, I think English carriages superior to all others. Let any one examine a series of foreign designs from, say, ten years back to the present time, and he will see that the characteristics of the older ones are short, broken, contorted lines, defective proportion, a tendency to over-elaboration, particularly in the seat-stays, steps, wheel-irons, and pump-handles, and that these characteristics have grown less and less pronounced,—that is, these designs have become more assimilated to the chastened and simple elegance of a high-class English carriage. I do not mean to say that all English carriages are perfect. I have seen now and then monstrosities on two and four wheels made in England. I mean the carriages made by men of experience, ability, and good taste, and I boldly assert that their carriages have no equals in the world.

I confess that we are not so far ahead of some nations as we used to be.

The trimming and painting of carriages have changed little in forty years. The colours and their arrangement were much the same then as now. The darker shades of green, blue, and brown predominate at present and have predominated for some time. These colours in rep, cloth, leather, or silk, whether in the plain or fluted style, can at best be made to produce only negative results, and perhaps that is the reason why they are adopted so widely; for the lining of a carriage should be treated as a background for a lady's toilet. I do not say this is the idea that always influences the coach-builder in producing, or the lady in ordering a carriage; but that it has operated on both unconsciously I have no doubt, and that this taste for sombre colours is based upon a sound principle, that anything showy, — anything that might produce a violent and perhaps a disagreeable contrast, must be avoided. But are dark green, blue, or brown the best for this purpose? when they are it is more a matter of chance than of selection. It would not be easy to find a colour that would be a suitable background for peacock blue, bright mauve, or London smoke without marring the appearance of that part of a carriage which should be remarkable for good taste.

Coach painting has for a long time been at a standstill. It is no better and no worse than it was fifty years ago. Heraldry, that might have developed into something worthy of the name of art, owing to a stupid tax, is dying fast. Straight lines, of varying width, that often cannot be seen ten yards off, are universally accepted as the *ne plus ultra* of carriage decoration. In no other branch of manufacture would such decoration be tolerated. It is mechanical and conventional in the narrowest and most objectionable sense of the words. Surely no one believes that this must continue so,—that in straight lines we have exhausted all the possibilities of carriage decoration. I know that there are difficulties in the way, and that not the least of these is cost; for a pound less or more often causes or prevents a sale,—and we shall have to overcome prejudice and custom,—discover what will most readily adapt itself to our work,—retain delicacy of hue and brilliancy of effect when varnished; but that it can be done successfully and artistically, may be seen in Japanese lacquered articles. Their japanned work is quite as brilliant, more durable and beautiful than our painting, and admits of decoration that rivals nature in freshness and purity of tint. Here we might get some valuable hints. The process is very similar to our painting. Each coat of lacquer is rubbed down with charcoal, a finer kind being used for each consecutive surface, and the last coat is polished with the ash of deer's horns, applied with a soft leather.

We have given to our carriages the essentials,—proportion and form; but they still lack the crowning element of colour,—colour artistically applied. That must, in a large measure, be done by our painters, and if by them, their work must be the outcome of culture, skill, and taste. These qualities are only found in perfection in those who have mastered the principles of decorative art, and who know by experience how these principles may be most effectively applied. Such men are few, more, I have no doubt, from want of opportunity than from want of talent. It will be for our art classes to develope what is latent in the rising generation of painters. Directed by men who know our needs,—stimulated by examples of the best work done by other branches of art-manufacture,—encouraged to break through the trammels of tradition, and free to give expression to their own thoughts, the result would be a style of decoration that would give to our carriages a value higher than that accorded to convenience and comfort,—that value which the refined of all ages have given to objects that harmonise with their sense of the beautiful.

Wimbledon.—A new Congregational church has been opened at Wimbledon. It has a spire 140 ft. in height. The building, which is of Godalming stone facing with Bath stone dressing, has been erected from a design by Mr. W. D. Church, architect, South-place, Finsbury. Mr. E. C. Ackermann, of Wimbledon, was the builder, and the cost will be about 6,000*l*., including extras and fittings.

MR. HODGETTS' LECTURES AT THE BRITISH MUSEUM.

THE two last lectures delivered by Mr. Hodgetts at the British Museum are so intimately connected with each other that we have preferred noticing them together to giving a detailed account of each.

In the lecture on the "Rune," the intention of the lecturer was to show that notwithstanding certain similarities between the Græco-Phœnician alphabets and the Teutonic Futhork, there was no evidence of copying from one by the other, nor was the similarity greater than might be expected in expressions of thought in signs by members of one great family. The fact being that both Futhork and alphabet are descendants from a common stock long since extinct. Properly speaking alphabets were never invented, but had become evolved from ideographic systems long passed away, which in their turn were the daughters of some still more perfect system of representation of thought by sound, the result of a perception by man in an early stage of his history on the globe, of the congruous relation between mind and matter, which was the soul of the early myth.

The circumstances that the fundamental number of characters in the most ancient Futhork is the same as that of the letters of the early Greek alphabet, viz., sixteen, was duly pointed out, and the resemblance between the Roman B, R, and I, and the Scandinavian characters for the same sounds were dwelt upon at some length in proof of the assertion that they both were descended from a common parent. The name of each letter in the Old Norse, German, and Anglo-Saxon systems was next investigated and shown to be identical in all the Teutonic series, of which the English Futhork was the most complete, and farthest from the classic models.

There were, in this very perfect system, forty letters, by which the sounds of our copious language could be well rendered, while the more meagre Roman alphabet is quite inadequate to our wants. The peculiar wealth of vowel sounds, in which we are so rich, found an exponent in the Runes, which, besides their initial value as letters, had a mystic or inner life which had to be recognised as well. Thus the Rune for T represents the head of a javelin, which is properly called *gár*, but it is the attribute of the god Tyr, for the initial of whose name the weapon is made to stand; so that the sight of the Rune, standing by itself, would call up the idea of the god, but in juxtaposition with other letters, it became T pure and simple. So with many others. The Rune N is called need, necessity, or tribulation, and denotes a knot, and it was usual for the bridegroom at a wedding to draw this knot on the nail of the bride's little finger, representing thereby the marriage knot or nuptial tie. The vowels in the Futhork are certainly very fully rendered, and Mr. Hodgetts deplores the loss we have sustained in adopting a system so imperfectly adapted to our wants as the Roman. The difficulty of knowing what to do with a word which we meet with for the first time is a hardship which we have no right to have imposed upon us, and he referred to the modern Icelandic alphabet, in which, although the letters were taken from the Latin alphabet, certain modifications had been made which rendered it phonetic,—the *a* in ball, fall, all, &c., being represented by A, with an inclined bar over it, thus Á; the *a* in man, can, fan, &c., by Æ; the long I in mine, ice, I, &c., is represented by Í; and the sound in it, wit, &c., by the ordinary character.

Some of the forms of the more elaborate Runes are very interesting indeed. The sign "Œthel" or "Æthel" is a picture of an enclosure, and means land, but as the possession of land conferred nobility, or was a necessary element in possessing noble rank, so the sign came to represent nobility, and the word Æthel; so that in writing such a word as Ethelred, for example, all that was necessary was to write the Rune in question, and the letters "r e d" after it. Alone it stood for land or country; so with the rune ING, a termination of constant occurrence in Anglo-Saxon, we have a representation of a field,—"ing" (Swedish "äng") meaning a field; but when used as a suffix, it was only the syllable "ing."

It is historically true, that with the religion of Rome we adopted the character of the Latin alphabet; but although Latin killed the Runes, they lived on into ages more familiar to us than the early times of our own kin. They were not forgotten in the first periods of the Norman usurpation, and at an earlier time, when we should least have expected it, we find a Christian poem cut in stone in Runes. In the very period when we must have supposed that the ecclesiastical fury of the Rome-aping priesthood would have exhibited the greatest repugnance to the use of the forbidden signs, we find a portion of a poem resembling Cædmon's paraphrase, cut in Runes on the celebrated stone cross at Ruthwell, in Annandale. It is supposed to be of the seventh century. Another cross at Bewcastle, in Cumberland, was raised in honour of King Alcfrid, who, conjointly with his father Oswin, reigned in the kingdom of Northumbria, and who died in the latter half of the seventh century. The words are:—

+. This sigbecun	This memorial
Settæ Hwætred	Hwætred set
em gærfæ boldu	and carved this monument
æfter baræ	after the prince
Ymb cyning Alcfridæ	after the king Alcfrid
gicegæd heosum sawlum.	pray for their souls.

There is a cross at Collingham (Yorkshire) supposed to be erected to King Oswine, who died in the middle of the seventh century, when Christianity was fairly established.

The Rune is a plant of northern growth, and flourishes best in northern air. Even in the face of Christianity it held its own longer in the north of England, where these stones and crosses are found. It continued in use in Northumbria as late as the tenth century.

The fact of the survival of the Runes in Northumbria at a time when all traces of them had been lost in the southern part of the island, may be due to the more frequent intercourse with Scandinavia from the north than from the south, for this plant of northern growth flourished in Scandinavia long after its entire extinction in England. Therefore in the Exeter Book, of comparatively late date, archaic Runes of the Northumbrian type occur.

Another reason for the survival of the Northumbrian *Futho Tr*, and the destruction of Runic inscriptions in the south, was that Augustine in the south waged a fierce war against paganism, destroying every vestige of the older faith. But in a letter from Pope Gregory to St. Mellitus, he recommended that the symbols only of paganism should be abolished, and the holy places consecrated and made use of for Christian purposes. St. Paulinus carried out these instructions in Northumbria, but after his flight the work was taken up by missionaries of the Irish school, who pursued a different policy altogether, adopting the very symbols of paganism, but turning them to account as vehicles of Christian teaching. These missionaries permitted Runic writing, and we are able to discover inscriptions in this character down to the time of St. Oswald, when every trace of Runic lore had been stamped out in the south.

The lecture on the "Book" commenced with a philological investigation into the word "book," which was shown to be a Teutonic word living through all the Scandinavian branch, all the more especially German, and, as well as in our own language, referring, like liber, papyrus, &c., back to the vegetable kingdom. In our own case *bok* is the beech tree, of which staves used to be cut with four even surfaces, on which Runes were carved. Such an instrument was called a "Bókstæf," and such is now the name of a letter of the alphabet all through Scandinavia, Germany, and, in a corrupt form, in Russia, into which country it was introduced, with other elements of Scandinavian civilisation, by Ruric.

When a modification of the Roman alphabet superseded the English Futhork, the people who wrote were ecclesiastics. The earl had little time and less inclination for letters, and the ceorl (churl) had none, so that priest and monk were the people to whom the charge of book-making was confided. As the "bookstaff" had vanished before the littera, another substance had to be employed for the purpose of writing, and the skins of animals, properly prepared and called *bók fell*, or book skins, appeared. In this name of so different a substance,—taken too from the animal kingdom,—the word for the beech tree (*bók*) lived on; and, when paper superseded skin, the *book* lived on remaining unchanged, whatever its substance might be.

Of the mind of the Englishman the book is the exponent, and we find the earliest volume

we possess a record of daring deeds and heroic life. The hero Beowulf lives in the first English book, and lives on in all the hero life of the North. In the Nibelungen, in Sigwid Fafnirsbane, in many a saga and lay all over Germany and Scandinavia, we trace currents flowing from the parent spring, our own immortal Beowulf. The high chivalric feeling that animated the Teutonic and English,—and some of the Roman knights too,—is to be found in this grand epic of our race which we are never taught to read!

By the extreme courtesy and kindness of Dr. Bond and Mr. Thomson, the actual book was exhibited, and a portion read to the audience, and some of the chief beauties rapidly pointed out. The brilliant flash of the chain mail, the clang of the warriors' tread, the salt-sea flavour of the poem, and the weird nature of many of the circumstances of action were dwelt upon with the enthusiasm of one who certainly must be admitted to love his subjects.

The next lecture is announced for the 14th inst., the subject selected being the "Horn."

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the fiftieth annual meeting, held on Monday evening last (the full official report of which is not yet issued), the following gentlemen were elected members of Council for the ensuing year of office, namely:—Ewan Christian, President; David Brandon, F.S.A., Edward I'Anson, F.G.S., and Alfred Waterhouse, A.R.A., Vice-Presidents; Cole Alfred Adams (President of the Architectural Association), George Aitchison, B.A., A.R.A., Arthur William Blomfield, M.A., F.S.A., James Brooks, Arthur Cates, Joseph Clarke, F.S.A., Henry Currey, William Milner Fawcett, M.A. (Cambridge), James Barlow Fraser (Leeds), John Gibson, Octavius Hansard, John Honeyman (Glasgow), Edward Graham Paley (Lancaster), Professor Thomas Roger Smith, and Thomas Worthington (Manchester), John Macvicar Anderson, Hon. Secretary, and William Henry White, Secretary.

THE IRON AND STEEL INSTITUTE.

THE Iron and Steel Institute held their annual meeting last week, the Institution of Civil Engineers affording them the usual hospitality of their hall.

The official programme gave six papers for reading, and a seventh was afterwards added. Two of these were papers adjourned from the last meeting, and one of them now enjoys the distinction of being again shelved, Mr. Browne's paper on iron and steel permanent way, which was interpolated at the last minute, effectually ousting an unfortunate contribution on a new form of gas sampler.

The first paper that came before the meeting was one by Mr. J. Lowthian Bell, on the "Use of Raw Coal in the Blast-furnace." It was a long paper of eighteen pages, and bristled with analyses of fuels and gases, together with chemical formulæ and calculations. It would be impossible for us to do justice to it unless we could print it in full, and this our space forbids. A paper, by Mr. Smith-Casson on "Gas Puddling and Heating Furnaces," and another, by Mr. W. S. Sutherland, on "The Application and Utilisation of Gaseous Fuel," were next read and discussed together. The former paper described the Casson-Bicheroux gas-furnace. The gas is evolved in a separate furnace, which is exhausted by draught or forced out by blast. Mechanical feeding of the coal is followed. The air supplied for combustion is heated before mixing with the gas in the furnace, but regenerators are not employed. Mr. Sutherland treated of the recovery of by-products from the gases of blast-furnaces, the gases afterwards being used to raise steam. The apparatus proposed was illustrated by means of numerous diagrams. Both papers were somewhat severely handled by Mr. Head, who referred to work he had done in this field with the late Sir William Siemens.

The second day of the session (Thursday) commenced with the paper by Mr. Walter Browne, to which we have referred. The author advocated the use of steel sleepers, and gave at some length details of the success that had been attained in this direction by Webb on the London and North-western Railway. He also referred to the advance that the system of metal sleepers had made in Germany. One of the chief difficulties was endways slipping on curves; a second objection was the fear of corrosion of parts that were brought in contact. Mr. Webb used a washer of brown paper, soaked in Stockholm tar, and had the chairs and sleepers riveted together by a hydraulic riveter. A long discussion followed, in which Mr. Wood, of Middlesbrough, who had laid iron sleepers on the North-eastern Railway some years ago, Mr. Jeremiah Head, Mr. Markham of Staveley), Mr. Williams (of Middlesbrough), and other speakers, took part. If the opinion of the meeting may be taken as indicative of the opinion of the Iron and Steel Institute at large, the use of any other material than iron and steel for railway sleepers is little better than barbarism.

Following Mr. Walter Browne's paper was one by Captain C. Orde Browne, on the behaviour of armour of different kinds under fire. The descriptions of armour considered were:—

1. Wrought iron.
2. Wrought iron, with steel face (compound).
3. Solid steel.
4. Chilled cast iron.

Wrought iron yields locally, a clean hole being punched through it. Hardness and rigidity in the projectile were most required for this.

Compound armour,—either Cammell's, made on Wilson's patent, or Brown's, on Ellis's patent,—yields mainly by cracking in radiating lines from the point of impact. The shot sets up, or more commonly breaks to pieces. Here tenacity of shot is principally called for.

Solid steel, as made by Schneider, is rather less hard than the steel face of compound armour. As the shot enters, the plate swells forward round the shot and yields by radiating cracks.

Chilled iron is used for coast armour defences, and is very hard and rigid. The primary requirement of the shot is tenacity, and under heavy blows from steel shot, such as those made by Sir Joseph Whitworth, the whole mass will break up.

The lecturer went on to describe a large number of experiments made in this country, Russia, Italy, and elsewhere, illustrating them by means of diagrams and photographs. He condemned the practice, followed in England, of testing our own projectiles against our own armour, instead of trying their effect on the armour used by foreign nations. For (as the author pithily put it), although we may by the former means be killing two birds with one stone, the effect is lost if one of the birds happens to be the wrong one. What we want to know is how our projectiles will act on our enemy's armour, and how much our armour will withstand our enemy's projectiles.

Captain Browne concluded a very able paper by saying that last year a commission was sent over from America to investigate the condition of iron and steel in Europe. It is said the report speaks unfavourably of English steel. This is to be understood if it refers to our steel projectiles, which seem specially to need encouragement at the present time.

Perhaps the paper of most general interest in the whole series was that by Mr. William John, of Barrow, on "Iron and Steel Shipbuilding," which, with its discussion, occupied the whole of the last day's sitting. The main point touched upon was the increasing substitution of steel for iron in the construction of vessels. In 1879, twenty-two steel steamers were built of a total tonnage of 19,522 tons, and one sailing ship of 1,700 tons. In the same year 337 iron steamers of a total tonnage of 428,082 tons and thirty-three iron sailing vessels of 35,332 tons were launched. The percentage of steel to iron has gone on increasing, until last year we had, of steel vessels, ninety-two steamers, tonnage 141,552 tons, and eleven sailing vessels of 14,193 tons; iron, 548 steamers, tonnage 742,292 tons, and seventy-two sailing ships, tonnage 114,698 tons.

The author spoke of the much greater trouble that was experienced at the Barrow Shipbuilding Company's yard when dealing with iron than when using steel for marine constructive purposes. During last year, out of 75,000 tons of iron used at the Barrow Works 33 tons were condemned. The loss, trouble, and delay caused in this way was very great, and compared unfavourably with steel.

The author cited several cases of steel ships going ashore and being got off again safely, whereas they must invariably have been lost had they been of iron. In one case a plate was dished 5 in. and yet the vessel did not make water. The paper touched very lightly on the engineering question, one point noted being that the Vulcan Forge are laying down appliances for rolling boiler plates in continuous rings, and so doing away with longitudinal seams in boilers. If this can be done, as Mr. John seems to think it can be, there is a chance that, combined with Fox's flues, the continuous plate will put the boiler in advance of the engine. That is to say, we shall have ordinary practical boilers capable of generating higher pressure steam than the engines can use. It will then remain for the engineer to devise a better form of packing and an efficient means of lubrication, suitable for the greater heat of steam due to higher pressures. The paper concluded with a reference to the adoption of steel castings in place of iron forgings in marine engines and in such parts of vessels stern frames, stems, &c. A long discussion followed, the representatives of iron speaking vigorously in defence of that material, and being, of course, met by equally vigorous replies from the steel manufacturers.

THE HILL TOWNS OF NORMANDY.

ALTHOUGH the western districts of Normandy are less rich in architectural treasures than those which lie more to the east, and include the towns of Rouen, Caen, Lisieux, and Evreux, yet in natural beauty they are more attractive and their towns possess a personality (so to say) which makes them well worthy of being visited. Moreover, the line of steamers from Weymouth to Cherbourg, and the recent opening of the direct railway from Cherbourg to Avranches, has done much to render these parts more accessible to English visitors. The most marked feature of the towns is the fact that they dominate the surrounding country from the summits or high slopes of hills,—thus Coutances, Avranches, Mortain, Domfront, and Vire, each stands at a height considerably above the sea level, and all are fairly entitled to be called the hill towns of Normandy. It is far from our intention to describe the features of these different places in detail, they are to be found in various works of an architectural or guide-book nature. But there is too great a tendency at the present day to run to and fro on the earth, and rather to despise places which can be reached from home in a short time and to give the preference to places simply on account of their distance from home; and it has always seemed to us that there is occupation enough in Normandy to give the architectural student a holiday for several successive years without going further afield. Architecturally, there can be no question that Coutances is entitled to the first place among the hill towns of Normandy. The commanding position of the town on a height, round which the Soulle winds, overlooking, so to speak, the Channel islands and the great bay which has its apex upon Mont St. Michel, is distinctly striking. When on the summit of this height is placed a fine Gothic cathedral the edifice gains immensely from the dominating character of its position. It seems to be typical of the way in which in Mediæval times the church had the command of men. Nor is it the cathedral alone, with its two western towers and its various noticeable interior details, such as the curious and most pleasing screens which divide the chapels of the nave one from another, but there is also the fine Church of St. Pierre to make Coutances remarkable. From the lower ground on the north-east side nothing could be more effective from a picturesque point of view than the east end with its flying buttresses. Passing westward along the coast line, the next hill town to be met with is Avranches. It is somewhat the custom to regard Avranches simply as a place from which Mont St. Michel may be visited, but in beauty of position it is not easy to surpass it. Placed on the high spurs of the hills which here descend steeply to the level of the sea, overlooking the fertile and wooded country which forms the lower parts of the valleys of the See and the Sélune where they meet Mont St. Michel bay, the cathedral which it once boasted possessed a superb situation. As it is, the so-called new cathedral possesses in its situation attractions which would otherwise be wanting. But Avranches is, perhaps, more remarkable as being a city which was once a place of strength; and it is not difficult, having the remnants of its ancient walls before the eye, to reconstruct in mind a fortified Norman city of Mediæval times. In the same way, at

Mortain, a town delightfully placed some twenty-one miles inland from Avranches, there are remnants of the stronghold of the Middle Ages. Unlike Avranches, it does not cover the top of the spur of a hill, it reposes on the higher sides of a little valley, which opens suddenly out to the westward, showing to the traveller a magnificent expanse of country, wooded and cultivated, stretching beyond the confines of Brittany. It may be doubted, indeed, whether from an equal height so extensive a view is visible as that which is seen from the little Chapel of St. Michel perched on the rocks above the town. But Mortain, being yet unvisited by the railway, has an interest as showing, so to speak, an unmodernised Norman town. It has changed little probably in the last hundred years, and though it does not possess any of the picturesque old houses which are, or were, to be found in some Norman and Breton towns, it is an admirable example of the modern town of Normandy at the end of last century. Its one long street stretching along the hill side, with the church at the end, which, by the way, has a good Norman doorway on its south side, has not changed for years.

Continuing on the highlands of Normandy to the north, yet another hill town is to be seen (we omit notice here of Domfront), namely Vire. Here, again, we get back to Mediæval times, but in this instance we have before us not the fortified but the manufacturing city. The mills which still nestle in the valley of the Vire bring back perfectly the mills which in quite ancient times clustered round the banks of the Vire and Viraine. It is true there are remains of a castle visible on the summits of the hill, and a mellowed cathedral and a clock-tower, which recalls, with its pious invocation to the Virgin to defend the town, other aspects of Mediæval life. But it is as a manufacturing Mediæval town that we prefer to regard Vire as we wander along the picturesque but dirty streets of the old lower town. In the upper and more modern part, with the view far to the north, we may recognise a flourishing and provincial town of the nineteenth century. It will be thus seen that each of the Norman hill towns which we have named has distinct characteristics. Domfront and Avranches are strongholds; Coutances is the cathedral town, the centre of ecclesiastical power; Mortain is the quiet provincial Norman town of the last century; and Vire is the busy centre of manufacturing industry.

BARTOLOZZI DECORATIONS.

MESSRS. H. & J. COOPER are persons of taste. Perhaps not anywhere in London may we see furniture of better design than in their obscure yet notorious shop in Soho. If, then, it should be necessary to say anything at all in dispraise of the present exhibition, it must be said with great circumspection, and under a keen sense of the littleness of criticism as compared with the greatness and glory of trade.

Besides Mr. Tuer, who wrote the big book, there are a number of enthusiastic people to whom Bartolozzi is an artist second to none. The ordinary man would certainly not desire to have the works of Bartolozzi empannelled in all the furniture of his room. If, however, there be an enthusiast, or lover of novelty, who wishes to see how tastefully this may be done, he cannot do better than pay a visit to Messrs. Cooper. He will do well, in that case, to remember, unless already a connoisseur, that the impressions are from plates which have seen upon an average a hundred years of active service, and that, therefore, whilst many indeed are wonderfully good, others are from worn and retouched plates, and are no less wonderfully bad. The first of the rooms in this exhibition is simply a gallery of engravings. Here let the visitor remember that the value of all these handsomely-mounted late impressions, after "restoration by expert, careful, and reverent hands," will soon, when the attraction of the novelty has ceased, be probably *nil*. As well might the purchasers of the Bewick blocks hope, by printing upon satin or white kid, to produce an edition of the "Birds," which should rival any of those which came from the press between 1797 and 1826.

The inner room, to which special attention is invited, is furnished tastefully throughout, the only remarkable feature being the introduction of "Bartolozzi" prints into all the furniture. It is fair to state, as it was encouraging to observe, that these are in most cases removeable. The panels which they occupy might be filled with wood, or with anything else, without any injury to the design. With regard to the prints themselves, no happier fate can be wished for them. A better epithet than *Decorative* could not be found wherewith to describe the works of this school, and, accordingly, they could hardly be seen at greater advantage than when made to subserve a purely decorative intention. One or two small screens with small prints inserted are nice enough, and these we should be pleased to possess. But of this sort of thing a little would go a long way. We can imagine a tiny boudoir made pretty by some one who had a fancy to maltreat his prints for the sake of a decorative effect. Only a connoisseur of good prints may make such experiments without vulgarity, and he would be the last man to attempt it. Messrs. H. & J. Cooper have hit upon an idea essentially meretricious, and they have published a catalogue, of which the preface is merely a trade advertisement. All this is in the beaten way of business, and no one can object to it. We have only to say that it would have been a better advertisement had it been better done. Leaving Bartolozzi aside, Messrs. Cooper's furniture is excellent. It is good in workmanship, and tasteful in design. In respect of a large "Mahogany Mantelpiece in free Louis XV. style," this praise must be somewhat abated. The public, Messrs. Cooper may think, has grown tired of straight lines. That it may well be, and yet be not prepared all at once for every abasement of the *baroque* style. Great festoons of mahogany drapery, and other vulgarities of a bad period, are introduced into doubtless handsome piece of work. This marks a relapse on the part of the Messrs. Cooper, which, it may be hoped, will not recur.

THE SURVEYORS' INSTITUTION.

PROFESSIONAL EXAMINATIONS, 1884.

THE Council announce that the following candidates have passed the recent Professional Examinations:—

Student Candidates for the Associateship.—Messrs. Harry Barratt, of Stourbridge; Robert Alan Benson, Walter de Hoghton Birch, Bernard Simon Dunning, John Henry Mead, of the College of Agriculture, Downton; William Timothy Hall, of Maidstone; John Baseley Selby, of Mornington-road, Regent's Park, N.W.; Edward Mixer, of Shepherd's Bush, W.; Thomas Willard, of Rugby. Of these candidates, William Timothy Hall receives the "Institution Prize" of 15*l.*, having obtained the highest number of marks (over 500) of any Student Candidate, and Robert Alan Benson and John Baseley Selby (bracketed equal) prizes of 10*l.* each, as second in order of merit among the Student Candidates.

Non-Student Candidates for the Associateship.—Messrs. Thomas Arthur Dickson, of the Agricultural College, Cirencester; Edward Greenop, of Brixton-rise, S.W.; William Redford Halkyard, of Knutsford; Robert George Petre, of Chelmsford; George William Sadler, jun., of Cheltenham; Theodore Sturge, of Bristol; James Bruce Watson, of Tetsworth, Oxon.; Jonas Marshall Webb, of Cambridge. Of these candidates, Jonas Marshall Webb receives a prize of 15*l.*, being first in order of merit of the Non-Student Candidates.

Fellowship Examinations.—The following candidates, who have previously passed the Associateship Examination, have been successful in passing the Fellowship Examination:—Messrs. Charles Herbert Bedells, of John-street, Bedford-row; Henry Johnson, of Walbrook, E.C.; and William Gustavus Stanhope Rolleston, of Leicester. The following Non-Associate candidates have also passed the Fellowship Examination:—Messrs. Alfred Mitchelmore, of Totnes, Devon; James Winder Peto, of Ixworth, Suffolk; and William Smith, of Salford Priors, Evesham.

Making together seventeen candidates who have passed the examination for the Associateship, and six candidates who have passed the examinations for the Fellowship, or a total of twenty-three successful candidates out of thirty-six who presented themselves for examination.

Mediæval Street, Health Exhibition.—In regard to this feature of the Exhibition, Mr. G. H. Birch, who designed it, wishes us to mention the name of the builder, Mr. Thomas Williams, of 6, Harrington-square, N.W., who erected the street in six weeks' time, working night and day. The clerk of works was Mr. W. G. Sutton.

THE ART-UNION OF LONDON AND WOOD-ENGRAVINGS.

SIR,—I have more than once felt inclined to address a letter to the *Builder*, as perhaps the best medium for calling the attention of its subscribers to the prints issued to them by the Art-Union of London. A climax seems to have been reached in the last year's print, and your most timely and judicious remark in your last week's issue will not, I trust, be without its due effect.

As a subscriber of over forty years, I have perhaps some right to a word or two on the subject; and I trust that others (and I have reason for believing that they who are dissatisfied with the existing state of things are not a few) may follow in the expression of the opinion to which I feel assured the columns of the *Builder* will be open.

The address of the chairman at the annual meeting seems to me singularly apologetic; but does it occur to him that the cause of the falling-off in the number of subscribers, to which he alludes in his opening sentences, is not far to seek? If the Art-Union claim that they are and have been "the only body which has produced really fine and important engravings, and has kept the art alive," surely the examples should be of the highest class. I do not deny that some few prints have been issued which are well worthy of being preserved and hung on our walls, but how many more have been, without much hesitation, relegated to the obscurity of the portfolio, and the size of which is, perhaps, their only claim to "importance."

The decadence of line-engraving is, I fear, beyond dispute, and the causes which have led to a result so much to be regretted is a subject too wide to be dealt with in the space of a letter. Where do we find any modern examples to compare with the works of Raffaelle Morghen, Sir Robert Strange, Woollett, Muller, and many others?

As to the revival of the art of bronze-casting, England has for many years been far behind our French neighbours, and we may justly be proud of some of the Art-Union productions, but they are costly, and consequently can be possessed only by a comparative few. Parian scarcely lends itself to the production of fine-art work, although some of the busts may fairly claim a place of honour.

The chairman objects that the work of the Art-Union is "ignored by a certain school of critics and writers"; few, however, will go so far as the late Samuel Rogers, who is stated to have said, "The Art-Union is a perfect curse; it buys and engraves very inferior pictures, and consequently encourages mediocrity of talent." I believe, sir, that the Art-Union has, to an appreciable extent, promoted a love of art, and it is because I believe this that I desire with you that a society with the large means and influence at its disposal should issue only works of the highest character.

If the claim to be a great society for the promotion of a love of art is to be sustained, I venture to think that a new departure must be taken, and, if a line engraving is still to be the chief *quid pro quo* to its subscribers, more care must be taken, not only in the choice of subjects,—a most important matter,—but in the execution and quality of the engravings. A name only, however eminent, will not cover careless or slovenly work. Why not give us a smaller print, costing, perhaps, less in its production, but let it be the best of its kind,—by a British artist, certainly; but if that be impossible, seek for it elsewhere. But pray let us have no more of such unfortunate works as that of last year, and some others of previous date which I will not particularly specify.

The prizes distributed to the subscribers at the annual drawings are valuable in themselves, and exercise a most beneficial influence; but these fall only to the lot of the fortunate few, and the question scarcely belongs to the issue you have raised, which is, I take it, that of the highest teaching, and, perhaps, I may add, the greatest good for the greatest number.

C. T. H.

COMPULSORY SANITARY INSPECTION.

SIR,—In handing you the enclosed copy of letter from Colonel Thorneycroft, published in a local paper, allow me to call the attention of the Institute and the profession generally to the clauses in the Act referred to, for compulsory sanitary inspection, which materially affect the body of architects at large.

It is necessary that some steps should be taken to prevent these clauses being quietly smuggled through the House for the benefit of sanitary engineers and inspectors of nuisances at our expense.

Colonel Thorneycroft, like a good many other philanthropists, in his endeavours to help one body of men, entirely forgets or ignores the injury he is likely to do unto others.

By certain clauses and provisions of this proposed Act, every architect, from highest to lowest standing, will have to furnish complete copies of all plans, sections, &c., of buildings proposed to be erected, and to obtain the sanction thereto of these sanitary inspectors, many of whom have most probably undergone very little preliminary training, but learn their business as they go on. The expense and annoyance to clients occasioned by having two practitioners to consult *and pay*, instead of one, will induce the employment of these inspectors to prepare

designs, and as plenty of youthful architectural assistance can be obtained at small expense, it is more than probable that many architects will find their practice rapidly diverging into other channels.

As the Bill is to be read a second time on the 21st inst., it behoves the profession to prevent the gallant Colonel from carrying out a manifold injustice, not only to architects, but to the owners of house property generally, if his very stringent clauses are to be carried out in their integrity,

A PROVINCIAL ARCHITECT.

Books.

The Practical Applications of Electricity: a Series of Lectures delivered at the Institution of Civil Engineers, Session 1882-83. London: Published by the Institution. 1884.

ON the 15th of March, 1883, as some of our readers will remember, while the late Sir William Siemens was delivering a lecture on the electrical transmission and storage of power, in the theatre of the Institution of Civil Engineers, he was interrupted by a loud explosion, followed by the rattle of broken glass from the skylight. It being ascertained that the explosion, whatever it might be, formed no intentional illustration of the lecture, and had not taken place on the premises of the Institution, the lecturer immediately resumed; and it was only after the conclusion of the lecture that it was ascertained that the real cause of the report heard was the explosion of dynamite below the offices of the Local Government Board.

The lecture thus significantly illustrated was one of a series of six, which from February 15 to May 3, 1883, were delivered at the Institution by as many men of eminence, who were all Fellows of the Royal Society, and members of the Institution of Civil Engineers. These six lectures have just been issued in one small volume, for the value of which the names of the lecturers themselves form a sufficient voucher. These are, Mr. Preece, Sir Frederic Bramwell, the late Sir C. W. Siemens, Dr. J. Hopkinson, Sir F. A. Abel, and Sir W. Thomson. The subjects extend over the progress of telegraphy, illustrated by a map showing all the marine cables existing in February, 1883, telephones, transmission and storage of electricity, electric lighting, electricity applied to explosive purposes, and electrical units of measurement.

In the lecture of Sir W. Siemens is contained an account of his electric railway, six miles in length, connecting Portrush with Bush Mills, in the north of Ireland, illustrated by a plan of the line, and a drawing of the carriages. Sir F. Abel has given the best account that we have seen of the most extensive operation in the way of blasting that has hitherto been carried out or attempted; namely, the destruction of the reef of Hallet's Point in East River, New York (familiarly known as Hell Gate) in September, 1876. The area of the rock in question was three acres; and the object of the operation was to insure a minimum depth of 26 ft. below mean low water level over that surface. The preparation for the final shot was most comprehensive. An aggregate length of 742,567 ft., or upwards of fourteen miles, of galleries and tunnels was driven below the bed of the river; 6,741 holes, most of them 3 in. in diameter, and forming a total length of 58,445 ft., were drilled in the rock; and they were filled with 49,914 lb. of explosives. These consisted of "Giant powder," or No. 1 dynamite; "rend rock," the American rendering of *litho fracteur;* and Vulcan powder, another nitro-glycerine preparation, which is a mixture of nitrate of soda, sulphur, and charcoal with about 30 per cent. of nitro-glycerine. The operation of charging occupied nine days. The charges were connected in continuous groups in series of twenty, and these again were arranged in divided currents in eight groups, every group being connected with a distinct carbon zinc battery of 40 to 44 cells. Thus each battery was intended to explode 160 charges; and the simultaneous explosion of the whole was accomplished by a circuit closer, governing the whole of the series of 23 charges. When the mines were charged, water was admitted to the excavation, which it took 7½ hours to fill to the level of the tide. On the following day, the 24th of September, 1876, the explosion was effected. The maximum height to which the spray was projected was 123 ft., the volume of water raised being apparently trifling, as was the sensible shock experienced. The total amount of rock demolished by the explosion was 63,135 cubic yards, and it was practically successful over the whole area operated upon.

This illustration of the wonderful degree of control which science has attained over the great disruptive forces liberated by chemistry is very striking. We cite it by way of attracting attention to an educational work which, both in design and execution, is worthy of the important institution which has inaugurated the series of lectures, and of the eminent engineers who, without remuneration, have thus placed the rich stores of their special experience at the services of their younger professional brethren. The lectures give a view of the state of the electric science which is encyclopædic in its range, and luminous in its teaching.

The Practical Dictionary of Mechanics: being a description of Tools, Instruments, Machines, &c.; a History of Inventions, and general Technological Vocabulary and digest of Mechanical Appliances in Science and the Arts. By EDWARD H. KNIGHT. London: Cassell & Co., Limited.

THIS is a supplementary volume to the larger work by the same author. The title will indicate the great range of subjects treated of, and a glance at its pages will reveal its American origin. As the present work consists of rather less than a thousand pages, it will be apparent how manifestly impossible it would be for the author to adequately fulfil the promise of his title. On turning to the pages of the book this is still more apparent, and it is difficult to imagine any specialist, excepting perhaps a leader writer for a daily paper, who could be interested in more than half its contents. The feature that will jar more especially on the susceptibilities of the engineer consulting the pages of this work will be the constant recurrence of descriptions and illustrations of surgical appliances. Thus the third subject mentioned is "abcess knife," which we are told has a curved concave blade, and is contained in an ivory or tortoise-shell handle, not very exhaustive information for the surgeon, and utterly unnecessary for those who require technical instruction on "accumulators," a subject which follows shortly after. The same thing might be said of acoumeters, actual, eautery, acupressure pin, aërotherapy apparatus, æsthesiometers, and the thousand-and-one surgical devices that are more or less fully described.

The American origin of the work renders it difficult to review it from an English standpoint; but, making every allowance in this respect, we do not think the book will compare favourably with standard dictionaries of reference on mechanical subjects already before the public. For instance, taking at random the subject of launch engines, we have a little over three columns devoted to this matter and occupied principally by illustrations. The first of these is a perspective view of a vertical boiler and single cylinder engine, which could not well be made to work in any steam-launch it would be powerful enough to drive. An editor describing such an arrangement of engine and boiler as typical of machinery fitted for purposes of boat propulsion must be ignorant of the first principles of the subject. The other illustrations under this head are undoubtedly taken from marine practice, but they certainly cannot be said to be representative of launch machinery, at any rate from an English point of view. Turning to the subject of "electric lighting," we have three small-type pages of descriptive matter and numerous illustrations. It naturally follows that the matter cannot be very fully dealt with within such limits of space, and indeed no pretence has apparently been made to bring the descriptions down to very recent date. The gas engine is another branch of mechanical engineering that has created a good deal of interest within the last few years. The principle of the Otto engine is well described, but no mention is made of some other well-known types, notably that of Clarke, which is surely worthy of notice. Over a page of descriptive matter is devoted to torpedoes; but here, again, no great effort has been made to bring the information to the present date. Turning over a couple of pages, we find testing machines more satisfactorily dealt with, there being two fair illustrations of Fairbank's and Emery's apparatus. Over two pages are devoted to a description of the telephone, which is accompanied by a full page of illustrations. Three locomotives are illustrated, two in full page. They are all of the American type.

The work has not in all cases been by any means carefully edited. For instance, under the letter H we have a description of "hot iron saw." Turning to I, we find another type of hot iron saw under the heading of "iron cutter," and again a third hot iron saw is described under another heading. It would be useless to carry our remarks on this book further. What we have said will serve to convey our estimate of the work, which, it will be seen, is not a high one. The illustrations in which the book abounds are of very unequal merit, some of them being decidedly poor, but the majority serve their purpose fairly well. The full-page engraving, of Florentine carved walnut panels, is an exquisite example of the illustrator's art, although it may appear somewhat out of place in a dictionary of mechanics. There is one feature in this work, however, of which we can speak in unqualified praise. To the notice of all the principal subjects treated of there is added a list, in many cases a very full one, of references to standard authorities, so that, if the student does not at all times find very full information in the pages of the work itself, he is directed where to look for it.

BUILDING PATENT RECORD.*

APPLICATIONS FOR LETTERS PATENT.

April 25.—6,798, J. B. O'Callaghan, London, Fastenings for Window-sashes and Casements, &c.—6,808, J. Hall, Stockport, Fire-grates, &c.—6,817, H. Westman, Birmingham, Fire-grates, &c.—6,820, T. C. Morgan, Hay, Flushing Water-closets.—6,834, W. Harrison, Sheffield, Door Handles and their Spindles.

April 26.—6,852, B. Shaw, Wakefield, Opening and Closing Doors in connexion with Hoists.—6,861, C. D. Abel, London, Separating and Collecting Soot from the Smoke of Chimneys, &c. Com. by R. Schomburg, Berlin.—6,874, C. F. Sanders, Birmingham, Flushing Water-closets, &c.

April 28.—6,918, F. West and J. P. West, Lewisham, Concrete Construction, &c.—6,919, J. C. Kent, Bedfont, Water-closet Disinfecting Apparatus.—6,923, A. Perkins, London, Register Stoves and other Fire-grates.

April 29.—6,993, E. E. Allen, London, Construction of Portable Buildings.

April 30.—7,009, J. T. Armstrong, Newcastle-under-Lyme, Curtain or Cornice Poles.—7,014, J. Gamlin and J. B. O'Neill, Birkenhead, Stair-rods, &c.—7,015, T. W. Helliwell, Brighouse, Securing Sheets of Zinc, &c., for Roofing Purposes.—7,028, J. G. Clements, London, Chimney-top.—7,033, S. W. Cragg, Baltimore, U.S.A., Pavements.—7,047, H. C. Smith, Richmond, House Sanitation.—7,055, M. Syer, London, Pneumatic Flushing Apparatus.

May 1.—7,061, J. L. Cartwright, Birmingham, Stench or Drain Traps.—7,088, G. H. Couch, London, Mould for the Manufacture of Bricks, Tiles, Ridges, &c.—7,089, W. Moyes, J. Moyes, and W. Moyes, Pollockshields, Urinals and Water-closets.—7,111, J. Watson and J. L. Spoor, Gateshead-on-Tyne, Kilns for the Manufacture of Portland Cement.

SPECIFICATION ACCEPTED.†

April 29.—628, D. Millward, Bowling-green, Manufacture of bricks, &c.—1,800, A. C. Smith, London, Exhaust Chimney-top and Roof Ventilator.—5,568, A. M. Clark, London, Fire-proofing the Joists, &c., of Buildings. Com. by W. H. Dolman, New York, U.S.A.

May 2.—534, A. W. Lake, London, Fireproof Concrete Roofs, Floors, &c. Com. by T. Hyatt, Brooklyn, U.S.A.—5,563, J. B. Petter, Yeovil, Stoves and Fireplaces.

NOTICES TO PROCEED

Have been given on the dates first named.

April 29.—5,870, W. Ross, Glasgow, Automatic Drain-flushing Apparatus (Dec. 27, '83—5,897, R. Lofthouse, Manchester, Ventilation (Dec. 28, '83).

May 2.—5,933, W. E. Heath, London, Shoring-up Dangerous Structures, &c. (Dec. 29, '83).—5,940, J. C. Mewburn, London, Water-closets, &c. Com. by J. E. Boyle and H. Huber, New York, U.S.A. (Dec. 31, '83).

ABRIDGMENTS OF SPECIFICATIONS

Published during the week ending May 3, 1884.

4,270, D. H. Dade, London, Protecting Wood and other Surfaces against Fire and Transmission of Heat (Sept. 5, 1883, price 2d.).

The wood is first coated with a paint made by mixing ground powdered silicate cotton with a solution of silicate of soda, and then with a coat of ground powdered mica mixed with asbestos, barytes, sulphate of lime, and solution of silicate of soda. (*Pro. Pro.*)

4,418, F. F. Brown, Chester, Parquet Floors (Sept. 15, '83, 2d.).

The wood is formed into tesseræ, and these are made

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* Compiled by Hart & Co., Patent Agents, 166, Fleet-street.

† Open to public inspection for two months from the dates named.

into tiles so that the grain of the wood is perpendicular to the floor. (*Pro. Pro.*)

4,488, W. M. Simons, Nottingham, Roller-blind Furniture (Sept. 20, '83, 4d.).

A weighted lever is pivoted on the axle of the roller and the blind cord, after being wound round the roller, is led through the lower end of the lever. When the cord is released, the upper weighted end of the lever engages one of a series of pins or stops on the roller, and prevents its revolving. (*Pro. Pro.*)

4,490, S. Van Campen, New York, U.S.A., Decorative Tiles (Sept. 20, '83, 4d.).

These are made of paper, with the pattern embossed on them. The paper is then secured to paste-board, and a coating of size is given. The tile is then immersed in a colour bath, and afterwards varnished.

4,503, W. P. Thompson, Liverpool, Apparatus for Extinguishing Fire. Com. by T. André, Paris. (Sept. 20, '83, 2d.)

A series of pipes is placed round all the walls of the room, &c., to receive water under pressure and they are pierced with holes, which are furnished with taps. (*Pro. Pro.*)

4,527, R. E. Cox, London, Furnaces, Stoves, and Grates (Sept. 21, 1883, 2d.).

To allow anthracite or similar coal to be burned, the air spaces or passages of these grates are reduced by plates of metal, and one of the bars in front is fitted with a gas-burner to start the fire. (*Pro. Pro.*)

MEETINGS.

SATURDAY, MAY 10.

Royal Institution.—Mr. Hodder M. Westropp on "Recent Discoveries in Roman Archæology." (III.) The Palatine Hill. 3 p.m.

MONDAY, MAY 12.

Society of Arts.—Prof. W. Noel Hartley on "Fermentation and Distillation." (I.) 8 p.m.

London and Middlesex Archæological Society.—8 p.m.

TUESDAY, MAY 13.

Institution of Civil Engineers.—(1) Discussion on Mr. S. B. Boulton's paper on "The Antiseptic Treatment of Timber." (2) Mr. R. W. Peregrine Birch on "The Progress of Upland Water through a Tidal Estuary." 8 p.m.

Birmingham Architectural Association.—Mr. A. Reading on "Comparisons between English and Continental Renaissance Architecture."

Anthropological Institute.—(1) Mr. E. H. Man "On the Ethnology of the Andaman Islands." (2) Professor Flower, F.R.S., "On the Osteology of the Natives of the Andaman Islands." 8 p.m.

WEDNESDAY, MAY 14.

British Museum (Anglo-Saxon Room).—Mr. J. F. Hodgetts on "Early English or Anglo-Saxon Antiquities." (IV.). The Horn. 2 p.m.

Edinburgh Architectural Association.—President's Address.

Society of Arts.—Professor Fleeming Jenkin, F.R.S., on "Telpherage."

THURSDAY, MAY 15.

Society for the Encouragement of the Fine Arts.—Mr. G. A. Storey, A.R.A., on "Mysteries of Colour." 8 p.m.

Society of Antiquaries.—The Rev. H. J. Cheales "On a Mural Painting of the Resurrection, from All Saints' Church, Friskney." 8.30 p.m.

Clerks of Works' Association (St. James's Hall).—Mr. A. Reckenzaun on "Electricity: its Application to Public Works and Buildings." 8 p.m.

Royal Institution.—Professor Dewar on "Flame and Oxidation." (IV.) 3 p.m.

Chemical Society.—8 p.m.

FRIDAY, MAY 16.

Architectural Association.—Mr. J. A. Gotch, on "John Thorpe and the English Renaissance." 7.30 p.m.

Royal Institution.—Professor W. Odling, F.R.S., "On the Dissolved Oxygen of Water." 9 p.m.

SATURDAY, MAY 17.

Architectural Association.—Visit to a House in Kensington-court (Mr. T. G. Jackson, architect), 3 p.m.

Edinburgh Architectural Association.—Visit to Dalmeny House, Barnbougle, and Dundas Castles.

Miscellanea.

Third-class Season Tickets.—A deputation waited upon the Board of Directors of the Great Northern Railway, on the 2nd inst., to urge upon them the desirability of issuing season tickets to third-class passengers at a price bearing the same proportion to the first and second class season-tickets as exists between the ordinary daily tickets. At present the working man pays the railway company considerably more than even the first-class season-ticket passenger. The deputation included the Duke of Westminster and the Earl of Shaftesbury, the company named being represented by Lord Lymington, the Hon. Cecil Ashley, and Mr. Farrant, the deputy-chairman. The Chairman of the Great Northern Railway promised that the matter should have the careful consideration of the Board. We hope they will keep their word. Railway companies are slowly finding out that in many respects it is their interest to treat third-class passengers with as much consideration as the other classes, and we do not apprehend that the present case will be found to be an exception. Statistics that have been sent to us show that on a test length of line selected (Hornsey to King's-cross), while the first-class season-ticket holder pays 6d. per working day for transport, over three months, the third-class passenger pays 8d.

Northumberland Avenue.—The whole of the building-sites on both sides of Northumberland Avenue have how been let on lease by the Metropolitan Board of Works, the leasing of the sites for the erection of the Royal Colonial Institute, and residential chambers and offices by the Mayfair Mansions Company, which have just been effected, completing the lettings. In continuation of the National Liberal Club building on the south-west side is the Northumberland Avenue Hotel, which has a frontage of nearly 300 ft. in length, and is to contain eight floors, besides the basement. This structure has been carried to a height of several feet above the ground-line. Messrs. Isaacs & Florence are the architects, and Messrs. Perry, of Bow, the contractors. The Hôtel Métropôle, which occupies the whole of the Avenue frontage south of Scotland-yard, with a return frontage into Whitehall-place, is in a forward state, having already been carried five or six stories high. The three buildings thus named, together with the premises of the Society, occupy the whole of the south-west side of the Avenue on the north-east. On the north-east side the buildings in progress south of the Grand Hotel include the new premises for the Constitutional Club, which will have a frontage to the Avenue of upwards of 200 ft. Mr. R. W. Edis, of Fitzroy-square, is the architect, and Messrs. Lucas Bros. the contractors. The Charing-cross Turkish Baths adjoining, which have for some time past been in course of erection, have just been covered in, and will shortly be completed and opened. Mr. R. Walker is the architect, and Mr. Woodward, of Finsbury, is the contractor. Adjoining will be a block of residential chambers, about to be erected for the Mayfair Mansions Company. Mr. C. D. Martin is the architect, and Messrs. Perry, of Bow, the contractors. Immediately to the south will be the Royal Colonial Institute, the foundations of which are now being got in. Messrs. Habershon & Fawckner are the architects, and Messrs. Patman & Fotheringham the contractors. At the south angle of the Avenue and Northumberland-street another block of residential chambers is about to be erected, which, it is stated, will have "novel arrangements," the ground and mezzanine floors being intended to be let for a bank, insurance offices, or other public purposes. Messrs. Bassett, Keeling, and C. D. Martin are the joint architects; and Messrs. Perry & Co., of Bow, are the contractors.

Compressed Air to Let.—At present there is a Bill before Parliament which is to give to a joint-stock company powers to erect very large engines on land within the Borough of Birmingham, and adjacent to the Birmingham and Warwick Canal, and to lay mains in a certain area. The steam engines are to be of great power, and their duty will be to keep the mains charged, by means of suitable pumps, with air at a pressure of 45 lb. per square inch. This compressed air is to be supplied to customers just as gas now is, and its function will be to drive small engines for manufacturing and other purposes. Those who already possess small steam engines and boilers will be able to discard the boilers and all nuisance and expense attendant thereon; while those who have hitherto wished for mechanical power, but been unable to have it, will only need to supply themselves with small engines of a cheap and simple form, in order to be able to avail themselves of the power offered. In many cases local considerations, conditions of lease, or questions of insurance, prevent the employment of a steam engine; not because of the engine itself, but on account of the boiler. In such cases compressed air will often solve the difficulty, as there can be little more objection to a small engine so driven than to sewing-machines.—*The Hardware Trade Journal.*

Surveyorship, West Hartlepool.—Last month, Mr. J. W. Brown, surveyor to the Aston Manor Local Board, was elected to the town surveyorship of West Hartlepool, at a salary of 400*l.* per annum. The following were selected to be interviewed by the Commissioners, viz.:—Mr. Brown; Mr. Higgs, chief assistant, borough surveyor's office, Bradford; Mr. W. T. Olive, A.-M. Inst. C.E., chief engineering assistant, city surveyor's office, Manchester; Mr. John Price, A.-M. Inst. C.E., engineer and surveyor to the Barton Sanitary Authority; Mr. Alfred Summerscale, A.-M. Inst. C.E., chief assistant, borough engineer's office, Leeds; and Mr. Walstenholme, chief assistant, borough engineer's office, Blackburn.

Earthquakes and Luminous Paint.—The connexion between earthquakes and luminous paint would hardly be apparent to any one without explanation. It nevertheless exists, and the recent earthquake in our own country has served to remind us of its existence. As a matter of fact, the Pioneer Paint Company, who are working Balmain's luminous paint patents, send in large consignments of this paint to those countries where earthquakes are prevalent. The use to which it is put invests it with the utmost importance just for the few critical moments of the shock. In the Phillipine Islands, where earthquakes are not uncommon, small metallic plates coated with luminous paint are so placed about the premises that at the first warning the inmates are quickly guided to the door, and thus to the street. In Manilla it is laid on in patches about the bedrooms and staircases, serving as guides for the door-handles and the stairs, night lights being considered especially dangerous as likely to set fire to the falling house, and thus to roast the inmates in their own homes. It follows that those who live in districts likely to be visited by earthquakes will do well to adopt this plan, and to burn no flame lights at night, especially in the case of gas, the pipes for which might be broken asunder, and the gas escape and take fire. The gas should be turned off at the main nightly, and luminous labels be so placed as to indicate the door-handles and other guides to the main point of egress, which would enable the residents to find their way out of their houses in the dark before the walls perchance buried them.—*Iron.*

Discovery of the Necropolis of San (Zoan).—We extract the following from the *Times*:—"At a spot never visited by Mariette and unexplored save by pillaging natives, Mr. W. Flinders Petrie has just identified the site of the long-sought Necropolis of San. Results of great historic interest may be hoped from this important discovery. Mr. Petrie also reports the recent excavation of a small chapel or shrine, of Ptolemaic date, containing six stelæ, two human-headed sphinxes, one royal statuette, and various minor objects. The plan of the chapel is cruciform, the upper end being occupied by an inscribed tablet representing Ptolemy Philadelphus and his sister-queen, Arsinoë, in adoration before Khem, Neith, and Buto. The upper part of this tablet was originally covered with a coat of gilding. The sphinxes were found *in situ*, flanking each side of the tablet. The other stelæ lined the walls of the two side recesses, and comprise (1) a second tablet of Ptolemy and Arsinoë, of fine Græco-Egyptian work, representing this king and queen standing face to face, sceptred and crowned; (2) a table of a king worshipping Khem, Horus, Isis, and Buto; (3) a funereal tablet of a private individual (probably the founder of the chapel), with an inscription in the domestic character; (4 and 5) two votive tablets in honour of the bull Apis. These objects are all perfect; but the royal statuette, which is 22 in. in height, has been broken in twain and reunited in ancient times. The chapel had apparently been walled up with its contents while Ptolemy Philadelphus was king, and so remained intact until revealed the other day by the pick of the excavator."

Sunday Opening.—The Sunday Society write, through their secretary, Mr. Mark H. Judge, that the Society of British Artists intend to throw open their galleries to the public next Sunday, from 6.30 to 9 p.m., as an experiment in regard to Sunday opening. Admission will be by ticket, to be obtained from the secretary, 8, Park-place Villas, W. While sympathising with the movement, we wish the Sunday sight-seers were going to be admitted in a gallery with better pictures in it than most of those to be seen at Suffolk-street.

Society of Arts.—The last course of Cantor Lectures for the present session will be on "Fermentation and Distillation," by Prof. Noel Hartley, F.C.S. The course will consist of three lectures, and will be given on Monday evenings, the 12th, 19th, and 26th instants.

Royal Institute of Painters in Water-colours.—Mr. Frank Dadd, Mr. H. R. Steer, and Mr. C. Napier Hemy, were, on Monday last, elected members of this Institute. Mr. Hemy is an important addition to their ranks.

Melksham.—The Local Board for the district of Melksham have appointed Mr. David Mackenzie, C.E., Melksham, Wilts, as the engineer for the new sewer drains proposed to be laid down in the principal parts of the town.

Society of Engineers.—At a meeting of the Society of Engineers, held on Monday evening last, at the Westminster Town-hall, Mr. A. Rigg, president, in the chair, a paper on "The Engineering of Malting," by Mr. H. Stopes, was read. The author sketched a brief outline of the early history of malting, and gave the statistics relating to the quantities of malt made, its present uses, and the capital and labour employed in the trade. The paper was divided into the following sections:—I. The usual or common English system of malting; II. The old-fashioned Continental system of Malting; III. The modern or pneumatic system of malting (Galland's and Saladin's); IV. The manufacture of black, amber, brown, crystal, and other special malts; V. The gelatinisation of rice or maize and other processes of preparing grain for brewers' use. Full descriptions were given of all the necessary buildings, apparatus, and tools employed in each of the above methods. A diversity of rules for the aid or guidance of engineers under each section were formulated, and a number of machines and appliances of a novel character were described, some for the first time.

Schools, Erdington, for the Aston School Board.—Six sets of designs were submitted in limited competition for the above, and on the award of Mr. E. R. Robson, F.S.A., Architect to the London School Board, the designs of Mr. William Henman, A.R.I.B.A., of Bennetts Hill, Birmingham, were selected, subject to a suitable tender being obtained within the stipulated expenditure of £3,500, which had to include the school buildings for 460 children in two departments, a caretaker's residence, covered playgrounds, the asphalting of the whole of the playgrounds, boundary wall, &c. On the invitation of the Board, fourteen builders submitted tenders; that of Mr. W. Bennett, of Lozells, amounting to £3,277, being the lowest, has been accepted, and the work is to be proceeded with so soon as the sanction of the Educational Department has been obtained.

TENDERS.

For the erection of new shops and assembly room at Ipswich, for the Ipswich Industrial Co-operative Society, Limited. Mr. James F. Goodey, architect. Quantities by the architect:—

E. Catchpool, Ipswich	£9,500 0 0
A. Coe, Ipswich	9,090 0 0
Grimwood & Son, Sudbury	8,400 0 0
Kenny, Ipswich	8,190 0 0
R. Girling, Ipswich	8,098 0 0
Everett & Son, Colchester	7,809 0 0
O. Gibbons, Ipswich	7,600 0 0
G. Dobson, Colchester	7,580 0 0
C. Wyatt, Ipswich	7,328 0 0
G. Chambers, Colchester	7,100 0 0
R. Smith, Ipswich	7,097 0 0
F. Dupont, Colchester (accepted)	6,935 0 0

For additions to residence for Mr. E. Thomas, at Wooburn, Bucks. Mr. Arthur Vernon, architect, High Wycombe:—

Gibson	£1,665 5 0
Silver	1,621 0 0
Woodbridge	1,597 0 0
Loosley	1,500 0 0
Hunt (accepted)	1,488 0 0
Martin	1,390 0 0

For new conservatory and verandah to residence at Wooburn, Bucks, for Mr. E. Thomas. Mr. Arthur Vernon, architect:—

Gibson	£585 5 0
Silver	485 0 0
Woodbridge	459 0 0
Martin	405 0 0
Hunt	394 0 0
Loosley	387 0 0

For new stables to residence for Mr. E. Thomas, at Wooburn, Bucks. Mr. Arthur Vernon, architect:—

Woodbridge	£800 0 0
Silver	792 0 0
Gibson	787 12 0
Loosley	777 17 0
Martin	770 0 0
Hunt (accepted)	767 0 0

For new national school-room at Wycombe Marsh, Bucks. Mr. Arthur Vernon, architect:—

Lacey	390 0 0
Harris	380 0 0
Martin	375 0 0
Hunt	359 0 0
Loosley	357 17 0

For fitting up two fronts in shops adjoining to Falcon Tavern, Clapham Junction, for Mr. J. Taverner. Mr. H. J. Newton, architect:—

Godden	£155 0 0
Lamble	145 0 0
Pickersgill (accepted)	139 0 0

For rebuilding farm buildings at Drayton, for Mr. T. N. Dewe. Mr. J. S. Dodd, architect, Reading:—

J. Dover, Oxford	£380 0 0
W. Stevens, Abingdon	358 0 0
C. Hunt, Abingdon	349 0 0
Buckler Wheeler, Abingdon	345 0 0
E. Williams, Abingdon (accepted)	300 0 0

Erection of schools at Rutland-street, Tower Hamlets, for the London School Board. Mr. E. R. Robson, architect:—

M. Gentry	£12,375 0 0
J. Grover	12,260 0 0
T. Boyce	12,220 0 0
Atherton & Latta	12,131 0 0
W. Oldrey	12,120 0 0
C. Cox	11,995 0 0
W. Bangs & Co.	11,840 0 0
G. S. Pritchard	11,810 0 0
W. Brass	11,772 0 0
W. Shurmur	11,691 0 0
Kirk & Randall	11,665 0 0
Patman & Fotheringham	11,653 0 0
Perry & Co.	11,629 0 0
J. R. Hunt	11,603 0 0
Stimpson & Co.	11,558 0 0
C. Wall	11,527 0 0
W. Scrivener & Co.	11,483 0 0
H. L. Holloway	11,465 0 0
S. J. Jerrard	11,439 0 0
Wall Bros.	11,396 0 0
F. T. J. Wood	10,863 0 0

For the enlargement of Vittoria-place Schools, Pentonville, for the London School Board. Mr. E. R. Robson, architect:—

W. Goodman	£8,992 0 0
J. R. Hunt	8,837 0 0
G. S. Williams & Son	8,786 0 0
Steel Bros.	8,721 0 0
F. & F. J. Wood	8,595 0 0
W. Brass	8,592 0 0
W. Shurmur	8,568 0 0
Stimpson & Co.	8,533 0 0
C. Wall	8,444 0 0
H. Hart	8,421 0 0
T. Boyce	8,379 0 0
S. J. Jerrard	8,369 0 0
J. Grover	8,326 0 0
W. Scrivener & Co.	8,262 0 0
Wall Bros.	8,158 0 0

For proposed new water-closets and covered playground at Taxon-street Schools, Bermondsey, for the London School Board. Mr. E. R. Robson, architect:—

J. D. Hobson	£583 0 0
G. S. Pritchard	487 0 0
W. Shurmur	468 0 0

For proposed water-closets and covered playground at Cottenham-road Schools, Holloway, for the London School Board. Mr. E. R. Robson, architect:—

G. S. Williams & Son	£339 0 0
W. Shurmur	270 0 0

For new factory in Warwick-lane, E.C., for Messrs. Hitchcock, Williams, & Co. Messrs. Searle & Hayes, architects:—

Second Tenders.

Patman & Fotheringham	£5,890 0 0
Holliday & Greenwood	5,560 0 0
J. B. Axford	5,385 0 0
Mark Patrick & Son	5,261 0 0
J. O. Richardson	5,100 0 0

For Erdington School, for the Aston School Board. Mr. William Henman, 38, Bennett's-hill, Birmingham, architect. Quantities supplied by Mr. Chas. Henman, architect, 64, Cannon-street, London:—

W. & I. Webb	£3,880 0 0
Wilson & Son	3,767 0 0
J. Moffatt,	3,738 0 0
W. Robinson	3,680 0 0
T. W. Smith	3,638 0 0
Sapcote & Son	3,637 0 0
Surman & Son	3,600 0 0
J. Bowen	3,595 0 0
T. Robotham	3,590 0 0
Barker & Son	3,587 0 0
Barnsley & Son	3,548 0 0
Horsley Bros.	3,489 0 0
W. Lee	3,344 0 0
W. Bennett	3,277 0 0

For building a day or mess room at the Lambeth Infirmary, Brook-street, Lambeth. Messrs. Fowler & Hill, architects, Sergeant's-Inn, Fleet-street. Quantities by Messrs. Fowler & Hugman, Spring-gardens:—

McGee	£1,085 0 0
Riches	1,027 0 0
Horner	1,010 0 0
Belpim & Cook	953 0 0
Lucas & Son	940 0 0
Howell & Son	900 0 0
Higgot & Brown	898 0 0
Ford & Son	894 0 0
Gound	877 0 0
Tyerman	860 0 0
Croaker	860 0 0
Ansell	817 0 0
D. D. & A. Brown	805 0 0
Hammond	796 0 0
Pack Bros.	785 0 0
Dickenson	749 0 0

For alterations to the Variety Theatre, Hoxton. Mr. J. G. Buckle, architect:—

W. Shurmur	£396 0 0
Steel Bros.	378 16 0

For erection of Congregational Church, Barkway, Herts. Mr. D. Church, architect:—

Roberts	£1,197 0 0
Parker	1,061 0 0
W. Shurmur	980 0 0
Saville	873 0 0
Willmott & Son	835 0 0
Tinson	830 0 0

For the erection of factory at Greenwich, for Messrs. Lovibond & Son. Mr. J. H. Johnstone, architect:—

W. Shurmur	£1,280 0 0
Atherton & Latta	1,250 0 0
S. J. Jerrard	1,243 0 0
Bridle	1,192 0 0
H. S. Holloway	1,127 0 0

For completing flour mills at Burghfield, for Mr. J. Dewe. Mr. J. S. Dodd, architect, Reading:—

A. W. Dodd	£1,500 0 0

For finishing houses at Upton Park for the Land Investment Company, Limited. Messrs. Whitmore & Reeves, architects and surveyors, 14, Devonshire-square, Bishopsgate:—

R. M. Heath, New Wandsworth	£3,822 13 11
C. W. East, Plaistow	2,662 0 0
T. Donaldson, Leytonstone-road*	2,463 0 0
G. Moir, Upton	2,024 0 0
G. Cordery, Plaistow	2,171 17 0
Blomfield & Adams, West Ham	2,132 0 0
S. L. Stone, Forest Gate	2,000 0 0
T. Phelps, Custom House	1,900 0 0
W. Pollard, Forest Gate*	1,860 0 0
A. Nichols, Leytonstone	1,806 10 0
England & Thompson, Leytonstone	1,773 0 0
C. H. Richardson, Stratford, £1,700 or	1,675 0 0
T. Brickell, Manor Park†	1,552 0 0

* Part Tender. † Reduced and accepted.

For completing five houses at Upton Park, for the Land Investment Company, Limited. Messrs. Whitmore & Reeves, architects and surveyors, 14, Devonshire-square:—

W. Feary, Forest Gate	£650 0 0 !
H. Brackley Upton-lane	650 0 0
W. Moull & Sons, Cable-street	637 10 0
S. L. Stone, Forest Gate	500 0 0
W. Lake, Stratford	450 0 0
G. Moir, Upton	449 0 0
T. Brightmore, North Woolwich	420 0 0
C. H. Richardson, Stratford	405 0 0
T. Russell, Forest Gate	400 0 0
S. W. Hart, Plaistow	400 0 0
J. W. Martin, Upton	390 0 0
G. Cordery, Plaistow	380 0 0
T. Phelps,* Custom House	295 0 0
F. Nicholson, Forest Gate (withdrawn)	157 10 0 !

* Accepted.

For alterations and conservatory to residence, Dulwich, for Mr. James Henderson. Mr. R. Peters, architect, Wool Exchange, Coleman-street:—

Watson (accepted)	£175 0 0

For pair of villa residences at Sydenham, for Mr. W. S. Hart. Mr. Richard Peters, architect:—

Richardson Bros.	£650 0 0
T. Enner, Julian, & Co.	640 0 0
Watson (accepted)	605 0 0

For decoration and alterations to Nos. 12 and 14, Digby-road, Homerton, for Mr. W. Pittam. Mr. Richard Peters, architect:—

Richardson Bros.	£165 0 0
Watson (accepted)	145 0 0
Moody Bros.	90 0 0

For road and sewer (Contract No. 4), Mayow Park Estate, Sydenham. Mr. W. Whiddington, architect, 28, Finsbury Pavement:—

Marshall, Brighton	£330 0 0

[No competition.]

For erecting eight detached houses at Bromley, Kent, for Mr. Samuel Cawston. Mr. A. Cawston, architect, 9, Spring-gardens:—

G. H. Lay, Bromley (accepted)	£6,800 0 0

For roads, drains, &c., at Beech Hill Park, Hadley Wood, Middlesex (second section), for Mr. Charles Jack. Mr. Edwin T. Hall, surveyor, 57, Moorgate-street:—

W. Lloyd, Kilburn (accepted)	£3,541 0 0

For repairs to Elm Grove-road, Cricklewood, for the freeholder. Mr. Edwin T. Hall, Moorgate-street, surveyor:—

W. Lloyd, Kilburn (accepted)	£140 0 0

For roads and sewers, near Custom House Station, Victoria Docks, London, for Mr. R. J. Bowerman. Messrs. Hussey, Walcott, & Blackford, 1, Gray's-Inn-place, surveyors:—

T. Adams, Amhurst-road, Hackney (accepted)	£2,989 0 0

[No competition.]

For pulling down and rebuilding premises, 84, Westbourne-grove, Bayswater, for Mr. G. M. Carlisle. Mr. J. Christian Hukins, architect:—

Magee & Co. (accepted)	£1,300 0 0

For the pulling down and rebuilding of the Old King's Head, Fulham:—

Avis	£2,320 0 0
Rudkins	2,049 0 0
Chamberlain	1,998 0 0
Adamson	1,945 0 0
Smith	1,915 0 0
Pickergill	1,900 0 0
Beale	1,876 0 0

For sundry alterations and sanitary works at the Bermondsey Workhouse, for the Guardians of the St. Olave's Union. Mr. George Elkington, architect:—

Bargman	£446 0 0
Bullers	427 10 0
Brockwell	425 0 0
Preston	407 0 0
Smith & Barnes (accepted)	395 0 0

For new 120 quarter malting at Faversham, for Messrs. W. E. & J. Rigden. Mr. R. Waite, Duffield, Derby, architect:—

Section 2.—Above Ground Line.

Glasscock & Son, Storrford	£6,650 0 0
Paramor & Son, Margate	6,600 0 0
Perry & Co., London	6,055 0 0
H. Stiff, Dover	5,900 0 0
J. J. Wise, Deal	5,776 0 0
Wallis & Clements, Maidstone	5,770 0 0
L. Shrubsole, Faversham	5,699 0 0
G. H. Denne & Son, Deal	5,579 0 0
Dickinson, London	5,136 0 0
J. Greenwood, Mansfield (accepted)	4,900 0 0
Todhill & Bellamy,* Sutton Bridge	4,800 0 0

* Too late.

For alterations, &c., at Mill-street, Conduit-street. Mr. J. Hamilton, architect:—

Harper	£325 0 0
Larter & Son	295 0 0
Scott	290 0 0
W. Shurmur	270 0 0
Hayworth	255 0 0

For the enlargement of schools at Medburn-road, Chelsea, for the London School Board. Mr. E. R. Robson, architect :—

W. Goodman	£6,922	0	0
W. Oldrey	6,793	0	0
J. R. Hunt	6,600	0	0
J. Grover	6,483	0	0
H. L. Holloway	6,402	0	0
Patman & Fotheringham	6,344	0	0
S. J. Jerrard	6,249	0	0
F. & F. J. Wood	6,232	0	0
Stimpson & Co.	6,180	0	0
Perry & Co.	6,178	0	0
W. Shurmur	6,170	0	0
W. Bangs	6,165	0	0
T. Boyce	6,091	0	0
G. S. Pitchard	6,088	0	0
G. S. Williams & Son	6,059	0	0
W. Scrivener & Co.	5,999	0	0
Wall Bros.	5,932	0	0

For the erection of schools at Westville-road, for the London School Board. Mr. E. R. Robson, architect :—

Perry & Co.	£16,998	0	0
W. Brass	16,640	0	0
W. Downs	16,583	0	0
T. Boyce	16,540	0	0
H. L. Holloway	16,416	0	0
Lathey Bros.	16,330	0	0
Wall Bros.	16,300	0	0
C. W. Reading	16,154	10	0
Patman & Fotheringham	16,099	10	0
W. Tongue	16,057	0	0
J. R. Hunt	16,057	0	0
W. Scrivener	16,035	0	0
W. Olarey	16,000	0	0
J. Grover	16,000	0	0
H. Hart	15,990	0	0
W. Bangs & Co.	15,975	0	0
W. Shurmur	15,960	0	0
Stimpson & Co.	15,770	0	0
C. Wall	15,745	0	0
S. J. Jerrard	15,673	0	0

For the erection of Nos. 14 and 15, Hosier-lane, City. Mr. Alfred R. Pite, architect, 44, Bloomsbury-square. Quantities by Mr. Rockwood :—

Lonn	£2,024	0	0
Hayward & Son	1,950	0	0
Cowland & Co.	1,923	0	0
Grover	1,843	0	0
Williams & Son	1,783	0	0
Patman & Fotheringham	1,773	0	0
Toms	1,767	0	0
Woodward	1,750	0	0
Falkner	1,725	0	0
Smith & Sons	1,697	0	0
Hooper	1,618	0	0

For internal and external painting work, &c., at the Banstead School, Banstead, Surrey, for the Managers of the Kensington and Chelsea School District. Messrs. A. & C. Harston, architects, 15, Leadenhall-street :—

Liley & Wood	£2,247	0	0!
Johnson & Co.	1,520	0	0
Gordon, Kell & Smith	1,502	10	0
Harvey	1,492	0	0
Lapthorne & Co.	1,386	0	0
Longley	1,365	0	0
Deacon & Co.	1,226	0	0
Taylor	1,218	0	0
Kent Bros.	1,161	10	0
Barratt & Sons	1,155	0	0
Stevenson	1,070	0	0
Reed	1,050	0	0
Potter, Sutton, Surrey (accepted)	1,050	0	0!

For the erection of a house at Herne Bay for John Boosey, Esq. Mr. Robert Willey, 68, Ludgate-hill, architect :—

Farley, Herne Bay	£1,066	0	0
Brown, Herne Bay	1,049	0	0
Adams, Herne Bay (accepted)	999	0	0

For the construction of a new road south of the Castlebar-road, on the Hanger Hill Estate at Ealing. Mr. Robert Willey, architect :—

Killingback, Camden Town	£402	0	0
Nowell & Robson, Kensington	379	0	0
Adamson & Sons, Ealing	379	0	0
James Pizzey, Hornsey	369	0	0
Ford & Everett,* Kennington	352	0	0

* Accepted.

For repairs to Nos. 15, 16, and 17, Paternoster-row, City, and warehouse at rear. Mr. Robert Willey, architect :—

Hayward & Son, City	£737	0	0
Woodward, Finsbury	681	0	0

For alterations, repairs, and other works to be done at the Princess Beatrice Public-house, 55, High-street, Camden Town, for Mr. Arthur Bryan. Mr. A. G. Olley, architect, Wimbledon. Quantities supplied :—

Perkins	£1,177	0	0
Axford	975	0	0
Ansell	942	0	0
Mower (accepted)	833	10	6

For laying out, draining, &c., the extension of the Leamington Cemetery for the Leamington Prior's Burial Board :—

Holme & King, Liverpool and Kenilworth	£3,937	0	0
T. Bailey, Leamington	3,740	0	0
G. F. Smith, Milverton, Leamington	3,700	0	0
T. Mills, Leamington	3,543	0	0
George Law, Kidderminster	3,300	0	0
Curral & Lewis, Birmingham	3,110	0	0
T. Houghton, Leamington	2,900	0	0
Richard Bowen,* Leamington	2,594	0	0

* Accepted.

For pulling down and rebuilding the Old King's Head, Fulham, for Messrs. Bell & Co., Brewers. Mr. A. C. Bean, architect. Quantities supplied :—

Avis	£2,320	0	0
Rudkins	2,049	0	0
Chamberlain	1,998	0	0
Adamson	1,945	0	0
Smith	1,915	0	0
Pickergill	1,900	0	0
Beale	1,876	0	0

For new kennels, cottage, and other buildings, and alterations to dwelling houses and stables at Kingston Bagnuze, Berks, for the Old Berks Hunt. Mr. F. H. Barfield, F.S.I., Faringdon, Berks, architect and surveyor :—

Second Tenders.

Barns & Son, Witney	£2,609	15	11
Jos. Sheppard, Faringdon	2,424	0	0
Cadd & Son, Faringdon	2,246	0	0
Buckle & Wheeler, Abingdon	2,178	0	0
W. & J. Wheeler, Faringdon	2,041	0	0
Jos. Wheeler, Wantage	1,916	7	6

New Mission Hall, Harrow-road.—Messrs. John Allen & Sons, builders, of 24, Kilburn Park-road, write to say that their tender for this work, which appeared with others on p. 629 of last week's *Builder*, should have been marked "withdrawn through clerical error." The amount of their tender should have been 3,860*l*.

Special Notice.—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

TO CORRESPONDENTS.

E. T. (drawing received).—I. Q.—E. T. W. (we are not the least in want of your assistance or suggestions).—W. C. T. (no space this week).—Tristram (we can hardly see any advantage to be gained from publishing your letter).—W. S. (your notes are not sufficiently to the point).

Correspondents should address the Editor, and *not* the Publisher, except in cases of business.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

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Its construction allows of the angle of light being readily altered so as to reflect in any desirable direction.

Supplement to The Builder,

MAY 10, 1884.

GENERAL CONFERENCE OF ARCHITECTS.

THE SEVENTH* General Conference of Architects, held under the auspices of the Royal Institute of British Architects, was formally opened on Monday afternoon last, when Mr. Horace Jones, the retiring President of the Institute, received a not very large number of town and country Fellows and Associates, in the West Gallery of the premises in Conduit-street. Among the visitors who were welcomed by the President and Council was M. Chas. Lucas, Honorary and Corresponding Member of the Institute, and secretary of the Société Centrale des Architectes de Paris, to whose voice the members attending the Conference have had the pleasure of listening at two of the meetings. On the walls of the gallery in which the reception took place were exhibited a very interesting collection of working drawings and sketches by three recently-deceased masters, — Street, Burges, and Viollet-le-Duc. These drawings served to heighten the interest with which the three papers set down on the programme for Wednesday evening's meeting were looked forward to. The late Mr. Street's drawings were lent by Mr. Arthur E. Street; those of William Burges were lent by Mr. R. Popplewell Pullan and Mr. George Aitchison, A.R.A.; and those of M. Viollet-le-Duc were the *fac-simile* drawings published by MM. Morel, of Paris. A collection of bound drawings, sketches, and scraps, was also exhibited, this collection being lent by Messrs. Aitchison, Sydney Vacher, R. P. Pullan, and other members of the Royal Institute of British Architects.

On Tuesday a large number of the gentlemen taking part in the Conference visited the Guildhall Library and Council-chamber, the Eastern Extension of the Stock Exchange Building, and the works, now in progress, of the Metropolitan (Inner Circle) Railway. Separate reports of these visits will be found on other pages).

The business proper of the Conference commenced on Tuesday evening, when a meeting was held in the Institute room.

Mr. C. Barry, F.S.A., who occupied the chair, offered a few words of welcome in the name of the Institute. He added that the proceedings of the early part of the day had not been unprofitable or uninteresting. Visits had been paid to works of no inconsiderable importance, and he had been pleased to witness a large attendance at the New Stock Exchange buildings under the charge of Mr. Cole. Those who had visited the Inner Circle Railway had also found matter of interest. The paper which he would now call upon Mr. Cates to read touched some of the most important subjects that could be discussed by them.

Mr. Arthur Cates then read the following paper on,—

THE DUTIES, OBLIGATIONS, AND MUTUAL RELATIONS OF ARCHITECT AND CONTRACTOR, WITH REFERENCE TO ENGLISH AND FOREIGN PRACTICE.

WHEN drawing up the programme of the proceedings of this Conference, the Committee considered that "the duties, obligations, and mutual relations of architect, client, and contractor with reference to both English and foreign practice," would form an excellent subject for discussion at one of the meetings. They accordingly prepared a series of questions which were addressed to correspondents of the Institute, with the result that replies have been received from Professor Fenger, of Copenhagen, Th. Ritter Von Hansen of Vienna, and Herr Ende of Berlin.

Communications respecting the practice in America have also been received from Mr. Sydney Smirke, who practised for many years in America, and who will, I hope, be present here this evening, and favour the meeting with his observations on those points in which American practice differs from ours.

At the request of the Committee I have read these communications, and summarised them in such a manner as will, I hope, satisfactorily open the discussion.

For France I am indebted for much information to Mr. W. H. White and Mr. R. Phené Spiers, and have referred to some of the leading text-books on French Building Legislation, more particularly to,—

"Manuel des Lois du Bâtiment," published by the Société Centrale des Architectes.

Frémy Ligneville, "Traité de la Législation des Bâtiments," 2 vols. 8vo., 1881.

O. Masselin, "Nouvelle Jurisprudence et Traité pratique sur les Honoraires des Architectes," 8vo., Paris, 1879.

O. Masselin, "Nouvelle Jurisprudence et Traité sur la Responsabilité des Architectes, etc.," 8vo., 1879.

I must admit that when the questions settled by the Committee were first placed in my hands, I was somewhat startled by the wide range they covered, which seemed to me likely to require a whole conference or even a series of conferences for their complete discussion. As, however, the time at our disposal this evening is but limited, and the object of the meeting is to afford those who attend an opportunity of expressing their views and discussing points of general practice, I will, as shortly as possible, bring before you the replies which have been received.

Happily, the first question, which relates to the tenure of land for building purposes, has been thought to be of sufficient importance to have an entire meeting appropriated to its consideration, and to-morrow (Wednesday) morning Mr. Blashill will read a paper thereon.

The next series of questions relates to the architect, and it will be convenient to consider each separately. Thus:—

When an architect is employed upon the erection of a house, is it usual for him to perform the following services?—(*a.*) Preparing all the drawings that are required and a specification of the works; (*b.*) Arranging terms with the contractor or contractors; (*c.*) Superintending the work; (*d.*) Deciding on the amount of money that is to be paid to the contractor or contractors according to the terms and dates of payment.

To this, the reply from Copenhagen is the simple affirmative,—Yes; but in Austria the architect's duties appear to be somewhat more extended, as beyond those set out in the question he prepares an accurate estimate of quantities of the building to be executed, from which the contractors can ascertain the quantities of the several descriptions of work.

A similar practice appears to exist in Germany, and in France the preparation of the *Devis estimatif* is one of the duties of the architect, and is included in the services covered by his commission; but on this head more particulars will be given when the tariff of charges under which German architects work and the remuneration of French architects is considered.

To the third question,—Does the architect usually perform any other services?—the reply is in each case, No.

4. Is his decision as to the quality of the work and material and as to payments final and binding?—is answered, in accordance with ordinary English practice, with the proviso as regards Austria that if the contractor desires in such cases to appeal to a legal tribunal, the right of doing so must be expressly stipulated in the contract; while in Germany it is often stipulated in the contract that in cases of dispute one or more arbitrators shall decide the question at issue.

5. Is the architect responsible to the client for any losses that may arise through bad work or materials which he ought to have checked; and, if so, for a limited or unlimited time?

It appears that in Denmark this responsibility has not hitherto been exactly defined by law or by custom, but if losses have been suffered through the architect's neglect or liability the employer may sue him for damages within the first twenty years.

The reply from Vienna is vague, and to the effect that the contractor is held responsible for, and to make good, loss through bad work or bad material.

The Architectural Association of Germany has the responsibility of the architect to the client at present under consideration, but no decision has been arrived at. There the tradesman is responsible to the architect as well as to the client for the goodness of the work. In doubtful cases the architect leaves the selection of the tradesman to the client, thus giving the latter an influence by which he cleverly diminishes his own responsibility. No instance is known to Herr Ende in which an architect has had to bear the responsibility for the shortcomings of a tradesman. Every architect is legally answerable for his designs so long as these are followed. Where a tradesman deviates from the instructions of the architect the latter assumes the responsibility if he sanctions deviations in a general way. If the architect is demonstrably lax in his supervision, of course the law holds him responsible.

In France and those countries subject to the Code Napoléon the responsibility of architects and contractors is defined by six articles of the Code Civil, four of which are of general application, while Art. 1,792,—"Si l'édifice construit à prix fait, périt en tout ou en partie par le vice de la construction, même par le vice du sol, les architecte et entrepreneur en sont responsables pendant dix ans,"—appears to make the architect and contractor liable for ten years; and Art. 2,270,—"Après dix ans, l'architecte et les entrepreneurs sont déchargés de la garantie des gros ouvrages qu'ils ont faits ou dirigés,—relieves the architect and contractor from liability after ten years.

There has been considerable controversy as to the exact meaning of Art. 1,792, it being contended that it is only applicable where the architect is the contractor; but, nevertheless, the responsibility attaches to the architect under the general principles of Art. 1,382:—"Tout fait quelconque de l'homme, qui cause à autrui un dommage, oblige celui par la faute du quel il est arrivé à réparer"; Art. 1,383:—"Chacun est responsable du dommage qu'il a causé, non seulement par son fait, mais encore par sa négligence ou par son imprudence"; and Art. 1,992:—"Le mandataire répond non seulement du dol, mais encore des fautes qu'il commet dans sa gestion," which make him, in common with all other citizens, liable for the results of faults he may commit, and those he may by negligence or otherwise permit others to commit over whom he may have authority. For errors of design and want of skill resulting in failure of the building wkolly or in part, neglect of legislative enactments and municipal and police regulations, neglect of servitudes and easements to which the site is subject and which the architect could have ascertained, providing a building which does not satisfy the defined requirements, the client has his remedy against the architect alone. For improper execution of work, defective or improper material or workmanship, the client's remedy is against both contractor and architect: against the one for having committed the wrong, and against the other for having by inefficient superintendence permitted it; but the architect himself has his remedy against the contractor. These responsi-

* The first Conference was held in 1871, the second in 1872, the third in 1874, the fourth in 1876, the fifth in 1878, and the sixth in 1881. Copious notes of the proceedings will be found in the volumes of the *Builder* for the years named.